FEBRUARY 25, 1957

STEEL

The Metalworking Weekly

A PENTON PUBLICATION

Cutting Job Hopping Among Engineers

—page 64

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Single & Dual Chain

Single, Double, Triple & Five Draw

Wire Drawing Blocks

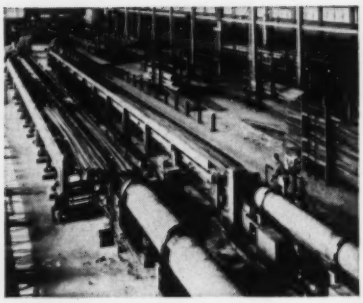
Loading Racks

Draw Bench Chains

Pinch Rolls

Carriage Head (Air-Operated)

Hooks (Air-Operated)



5-DRAW

COLD DRAW EQUIPMENT

for TUBES · BARS · SHAPES

Piercing Mills

Bull Blocks

Cold Reducing Mills

Squeeze Pointers

Rotary Bar Pointers

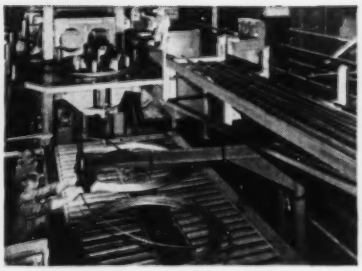
Run-Out Tables

Gag Straightening Presses

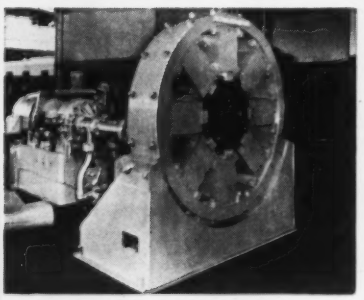
Rotary Roll Straighteners

Cracker Shears

Bar Shears



BULL BLOCK



SQUEEZE POINTER

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He saves you the risk of obsolete stocks

As a buyer of steel or steel products, have you ever found yourself with an inventory of obsolete items? Items perfectly suited to your last year's requirements but the wrong size, weight, or type for present needs? Such obsolete stock may represent a considerable loss.

You can avoid the risk of obsolete stock by letting the local distributor fill your needs—supplying exactly what you require, in exactly the right amounts.

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When you fill your requirements through the Bethlehem distributor, you will never be plagued with the hazard of obsolescence. Nor will you shoulder the costs that are always a part of maintaining inventory. So why not telephone the nearest distributor of Bethlehem products? You'll find him friendly, interested, and helpful in every way.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.
Bethlehem Pacific Coast Steel Corporation
San Francisco

BETHLEHEM STEEL

Call the distributor—your Shopping Center for Steel

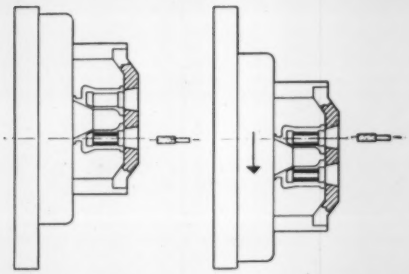
AUTO-INDEXING permits

single chucking for double bore grinding

Manually re-locating a part to grind a *second* bore takes valuable operator time. This time can be saved, in many instances, by the use of an auto-indexing fixture on a Heald Internal Grinder. For example, the Model 271 Size-Matic shown below precision grinds *two* interrupted bores in a universal joint body in a single, fully automatic, 71-second cycle.

The diagrams at right show how both bores of the work are brought in line with the grinding wheel — automatically!

This auto-indexing feature can be used for many two-bore grinding jobs of this type with substantial savings in handling time and more precise alignment of the finished surfaces.



Auto-indexing fixture in position for grinding first bore.

Rotary cross-feed unit indexed to position for grinding second bore.

IT PAYS TO COME TO HEALD!

HEALD

THE **HEALD** MACHINE COMPANY

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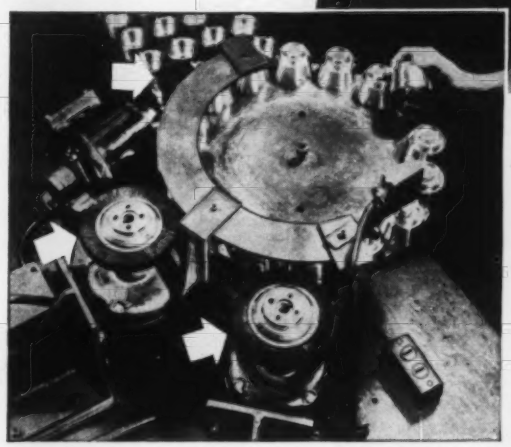
BEFORE BRUSHING

AFTER BRUSHING



At the push of a button.
Osborn Master® Wheels remove burrs and blend surface junctures. Costs are down 74% from previous hand method.

Push-button finish... 1400 per hour

THE manufacturer of this machined aluminum ammunition component was faced with the necessity for attaining a high production rate, and at the same time, meeting the standards of rigid quality control.

Working closely with the Osborn representative, he built the rotating fixture shown above. Three Osborn Master® Wheels quickly remove feather burrs, blend surface junctures. Uniformly finished parts come through at the rate of 1400 per hour.

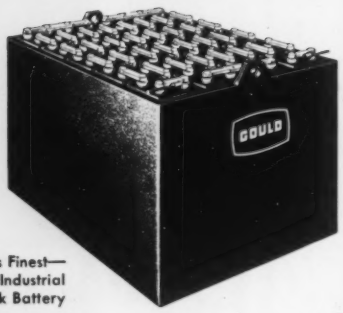
Osborn offers its services to you without obligation. A qualified **O**sborn **B**rushing **A**nalyst is available wherever industry centers. He will welcome the opportunity to work with you. Write *The Osborn Manufacturing Company, Dept. G-52, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

Write TODAY for the new 100-page Osborn Catalog 210-C.

Osborn Brushes

BRUSHING METHODS • POWER, PAINT AND MAINTENANCE BRUSHES
BRUSHING MACHINES • FOUNDRY MOLDING MACHINES

You Get "Hidden Horsepower" from gould BATTERIES



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Always Use Gould-National Automobile & Truck Batteries *More Power to you from Gould*

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The Metalworking Weekly

February 25, 1957
Vol. 140 No. 8

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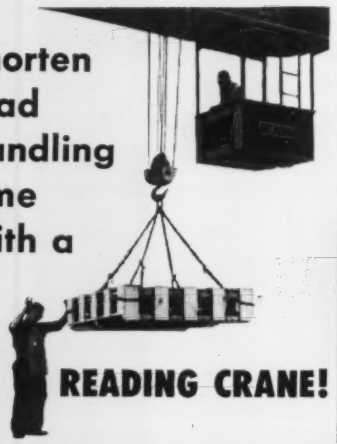
Index available semi-annually. STEEL is also indexed by Engineering Index, 29 W. 39th St., New York 18, N. Y.

Shorten load handling time with a



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behind the scenes

Four VIPs

Each year National Business Publications Inc. awards a Silver Quill to a man who has distinguished himself through public service. Recent recipients include Charles F. Kettering, director and research consultant, General Motors Corp.; Herbert Hoover, elder statesman and former President; and Vice President Richard M. Nixon.

Sen. Harry Flood Byrd (D., Va.) was so honored this year. Hence, the photo above, which was taken at the annual Silver Quill award dinner on Jan. 26 at the Statler hotel in Washington.

Reading from left to right: Postmaster General Arthur E. Summerfield, Mr. Justice Stanley Forman Reed, R. C. Jaenke and Vice President Nixon.

Mr. Jaenke is an NBP officer and executive vice president of the Penton Publishing Co., publisher of STEEL.

Senator Byrd isn't in the picture. Shrdlu isn't either—he wasn't even there.

No Time for Fear

You all recall certain celebrated references recently to hair curling, particularly as applied to a possible recession. In the dark corners of the minds of all who went through the great depression of the thirties, frightening memories still linger—and when the subject is brought up, we tend to get the shakes.

Well, Editor Walt Campbell considered the many stories predicting a slowdown in the economy, and came up with an editorial which he called "Don't Cry Wolf." It appeared in the Feb. 4 STEEL and immediately started an avalanche of reprint requests. More than 10,000 have been mailed already, and the calls are still coming in. Typical requests may be studied in the "Letters to the Editors" column, beginning on page 10.

In effect, the editorial asks for careful study of all economic indicators and warns against becoming hysterical if a few turn downward. If the tremendous response is any indication, the metalworking world, at least, is not going to be hypnotized into shaking hands with the devil before it meets him.

They Don't Care for Trifles

The cover story this week concerns the care and feeding of engineers. It reveals particularly how auto companies keep their turnover of engineers to a minimum. Judging from the national advertising one sees begging engineers to report everywhere, this type worker can write his own ticket, and the auto companies, fearful of having their engineers lured away, are giving these favored employees the red carpet treatment. If you are an employer of engineers, this article should interest you; if you are an engineer, it should fascinate you.

Shrdlu

(Metalworking Outlook—Page 47)

B.F.Goodrich report:

Hurricane of sand roars through hose

B. F. Goodrich improvements in rubber brought extra savings

Problem: To clean rough spots off metal, the workman is using a blast of sand that roars out of a hose nozzle at terrific speed. Efficient for cleaning, but the hurricane of sand was wearing holes through every kind of hose tried on this job.

What was done: When a B.F.Goodrich man heard about the trouble, he recommended a hose, specially developed by B.F.Goodrich to stand this rough treatment. Extra-soft rubber is used for the lining of this sand blast hose, so the sharp, destructive sand simply bounces off the rubber instead of digging in and cutting it to shreds.

Savings: The B.F.Goodrich hose has been on this job 3 years now—longer than any hose used before—and it shows no sign of wearing out.

Extra benefits: It is much lighter than sand blast hose used to be, more flexible, easier for workmen to handle. And there's no danger of workmen being shocked or jolted by static electricity, generated by sand rushing through the hose. Antistatic rubber carries away electric charges as fast as they build up.

Where to buy: Your B.F.Goodrich distributor has exact specifications for the B.F.Goodrich hose used in this sand-blasting job. And, as a factory-trained specialist in rubber products, he *can* answer your questions about *all* the rubber products B.F.Goodrich makes for industry. *B.F.Goodrich Industrial Products Co., Dept. M-863, Akron 18, Ohio.*

B.F.Goodrich

INDUSTRIAL PRODUCTS

WAGNER ISO-BRITE COPPER . . .

"The efficiency of your new Iso-Brite Copper bath will enable us to put a $7500 'semi' to work on other jobs. We get a deposit of .0005" in a 15 minute cycle and could easily get .0006" to .0008" if required. Iso-Brite needs less maintenance than any bath within our experience." (Robert Hilfinger, Pres. Hilfinger Corp. to Jos. R. Wagner.)

Die cast automotive grill part ready for nickel and chrome.

doubles

SEMI-AUTOMATIC PLATING!

CONVERSION TO ISO-BRITE ELIMINATES ONE MACHINE . . .

The record at Hilfinger Corp., Toledo, Ohio, tells a simple story. This big, 115,000 sq. ft. die casting plant with a 200-man plating department originally required two semi-automatic plating machines for plating copper before nickel and chrome on large automotive die castings. New Wagner Iso-Brite Copper bath was installed eight months ago in one tank, replacing a leading proprietary copper bath, both machines being operated by a single generator. Excessive burning of the competitive plate resulted. The single machine charged with Wagner Iso-Brite Copper now turns out Hilfinger's entire production requirement to the customer's specification, permitting the surplus semi-automatic to be devoted to other production.

If reducing finishing costs is of interest to you, consider these reasons why this new Wagner-processed chemical is making records everywhere:

Wagner Iso-Brite Copper offers

1. Ease of control
2. High anode efficiency—copper cyanide additions virtually eliminated
3. Much heavier plate
4. Fine grained, dense, ductile, fully bright
5. Freedom from roughness
6. Wide operating range—temperature 135-165°; up to 60 amperes per square foot
7. High tolerance of organic contamination

Wire, phone or write for Bulletin 70.2 for full technical information on Iso-Brite Copper and the Wagner cadmium and zinc brighteners and chromate finishes. Please pass this advertisement along to your purchasing agent or plating superintendent. The Wagner man in your area will assist you with any plating problem.

400 MIDLAND AVE., DETROIT 3, MICHIGAN

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Move fast against fire the instant it strikes, and you can stop it with little damage. But let it get a head start, and you may lose equipment, buildings . . . or your life.

Be selective in your choice of fire extinguishing equipment. Choose Kidde! You can be certain of rugged construction, simple operation, and absolute dependability.

For more than thirty years, Kidde fire extinguishers have been built to the most exacting specifications, have passed the most rigorous of tests, have the highest ratings. There is not a better-made extinguisher on the market today.

In ease of operation Kidde extinguishers also stand unsurpassed. The trigger-release grip on Kidde carbon dioxide and dry chemical extinguishers is the fastest and most natural to use. With it, even inexperienced operators can move swiftly and confidently against a blaze, extinguishing flames in seconds. You simply aim the horn, pull the trigger, and fire's out. Models with squeeze valves available too.

Finally, there is the Kidde service organization. In cities everywhere there are trained Kidde representatives who are ready to service your extinguishers.

For more information about the line of Kidde extinguishers, write for Kidde's P-8 Catalog.

Kidde (K Kidde)

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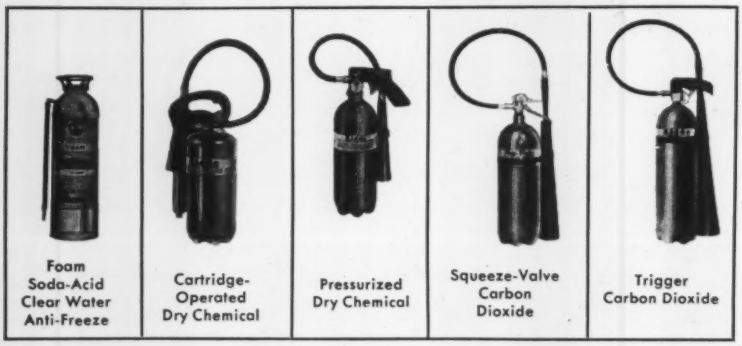

Foam Soda-Acid Clear Water Anti-Freeze

Cartridge-Operated Dry Chemical

Pressurized Dry Chemical

Squeeze-Valve Carbon Dioxide

Trigger Carbon Dioxide

LETTERS
TO THE EDITORS

Service to Marketing People

May I say that STEEL offers marketing people a continuing service with articles such as "Check Your Territories" (Jan. 21, page 40).

In addition to giving examples of territory changes, it offers an excellent selection of information sources for further study into marketing trends and changes.

We think so well of it that we would appreciate permission to reprint it in a forthcoming issue of *SE News*, with credit lines.

S. A. Waterman
Editor
Publishers Digest Inc.
Chicago

• *Permission granted.*

Readers Respond to Editorial

If you can send 50 or 100 copies of your editorial, "Don't Cry Wolf" (Feb. 4, page 57), I will see that they get into good hands—including our own 28 field men who have pretty glib tongues.

It seems to me that this editorial should be circulated to every publication in this country—and cause some of the so-called wisenheimers to look once again at the pencil point and see whether it is telling the truth when they put their words on paper.

E. R. Barkley
Vice President
Beaver Pipe Tools Inc.
Warren, O.

It was with both interest and agreement that I read your editorial. We would appreciate 25 copies.

R. R. Newell
Assistant Manager of Sales
Bar Division
Republic Steel Corp.
Cleveland

We appreciate your editorial. It is good to have offsetting influences counteract what might become a dangerous situation.

In the machine tool industry, we cannot take other than an optimistic view of both current and future situations. It is neither realistic nor practical to make comparisons on a day-to-day, week-to-week, or even month-to-month basis, since capital expenditures involving sums of the magnitude applicable to the types of equipment we produce are not made on a regular, even-flow basis.

It may be recalled that several years ago, a similar wave of ill-advised comments appeared in various publications, which at the time were completely uncalled for, and which reached rather

(Please turn to page 12)

Cutting the cost of finishing 77% is typical of results that can be achieved in "Abrasive Tech" Methods Rooms. In this case, the manufacturer uses an Openkote Garnet Cloth 100-J belt, with a formed serrated rubber contact wheel, to sand this golf-club head and neck. The same type of belt is then used with a harder durometer, 8-in. wheel to remove scratches from the aluminum sole plate and polish it. Finishing costs have dived from 4½ cents per head to 1 cent. Maybe your production can benefit similarly from Behr-Manning technical service.

Very often a Behr-Manning methods engineer can provide a helping hand with different finishing problems. Just call the nearest Behr-Manning office for a date. There are 17 well-equipped "Abrasive Tech" Methods Rooms, available for problem-solving, or helping finishers brush up on new techniques: Atlanta, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Detroit, Grand Rapids, High Point, Indianapolis, Los Angeles, Teterboro, Camden, San Francisco, Seattle, St. Louis, and Brantford, Canada. Main office and plant: Troy, N. Y. For Export: Norton Behr-Manning Overseas, Inc., New Rochelle, N. Y., U.S.A.

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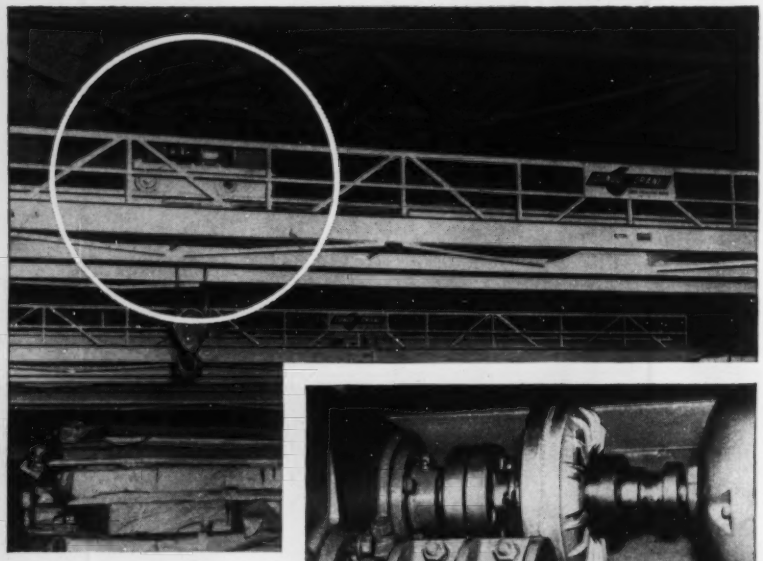
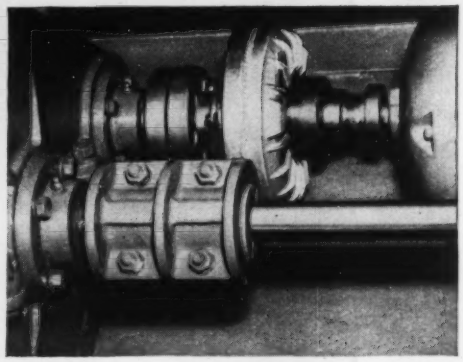




Above. Two of three Conco Engineering Works 10-ton, 55' span, 3-motor, floor-operated, overhead cranes in a mid-western steel warehouse. Right. Close-up of the Twin Disc Fluid Coupling installation showing simplicity and compactness of drive arrangement.

Here's how Twin Disc Fluid Couplings improve overhead crane operation

Load handling is easier for any crane when electric motors are equipped with Twin Disc Fluid Couplings. That's because, when starting the load from a dead stop, the "slip" of the hydraulic fluid permits acceleration quickly from low rpm to working torque.

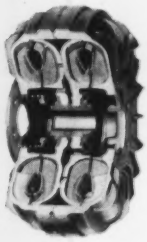
This smooth, cushioned acceleration eliminates dangerous jerking, swinging and swaying on load pick-up.

The pay-off comes in increased production, lower power bills because of minimized current surges and less equipment maintenance since the hydraulic fluid cushions out destructive shocks.

Also, fluid couplings often permit use of smaller capacity motors, for motor capacity can be based on running load rather than starting load.

Twin Disc Fluid Couplings and HYDRO-SHEAVES® are offered by all leading crane and hoist manufacturers . . . fluid couplings to 850 hp in capacity . . . HYDRO-SHEAVES to 50.

Write for Bulletin 144-D, Dept. DS, Twin Disc Clutch Company, Racine, Wisconsin.



TWIN DISC
CLUTCHES AND HYDRAULIC DRIVES

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Fluid Couplings

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LETTERS

(Concluded from page 10)

substantial proportions before being dissipated through natural economic procedures.

John M. Dolan
Vice President
General Manager—Field Sales Division
Giddings & Lewis Machine Tool Co.
Fond Du Lac, Wis.

Please send 60 copies. This is a sensible viewpoint of present business conditions which I would like to emphasize to our own men.

William V. Dyke
Manager—Distributor Sales
Blackhawk Mfg. Co.
Milwaukee

I fully and heartily agree. Please send 50 copies.

H. R. Kilpatrick
General Manager of Sales
Laclede Steel Co.
St. Louis

I am interested in this timely editorial and would like 15 copies to distribute to our territory managers.

Howard A. Johnston
President
Marlin-Rockwell Corp.
Jamestown, N.Y.

Please mail 300 reprints. It is timely and well worth reading.

A. J. Krantz
President and Treasurer
Reeves Steel & Mfg. Co.
Dover, O.

We would be pleased to receive 100 reprints to distribute to our various representatives and sales offices. We think the article should be broadcast and that the truth should be told.

Ernest B. Wolf
Vice President-Director of Sales
Bigelow-Liptak Corp.
Detroit

We would appreciate 100 copies for distribution to our people.

D. L. Irvine
Assistant General Manager of Sales
Wheeling Steel Corp.
Wheeling, W. Va.

Please send 125 copies so that we may circulate them throughout our organization.

E. F. Luna
Sales Promotion Manager
Anaconda Wire & Cable Co.
New York

We have read your provocative article and would appreciate 55 copies.

R. J. Severson
Assistant General Sales Manager
Ampco Metal Inc.
Milwaukee

I would like ten copies to circulate within our company.

It is unfortunate that so many who play with statistics do not treat them with the thoroughness, caution and respect which is essential. Unhappily, misuse does seem so much more common than good use.

Have you read the fascinating book of a few years ago, *How To Lie with Statistics?* When I find magazines, newspapers or marketing people ill-using statistics, I often wonder whether they have or have not read the book and whether they are or are not following its title direction.

Thanks again for your editorial.

Franklin S. Catlin
Sales Promotion Manager
Magnaflux Corp.
Chicago

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Talk it over with the most experienced furnace experts you can find

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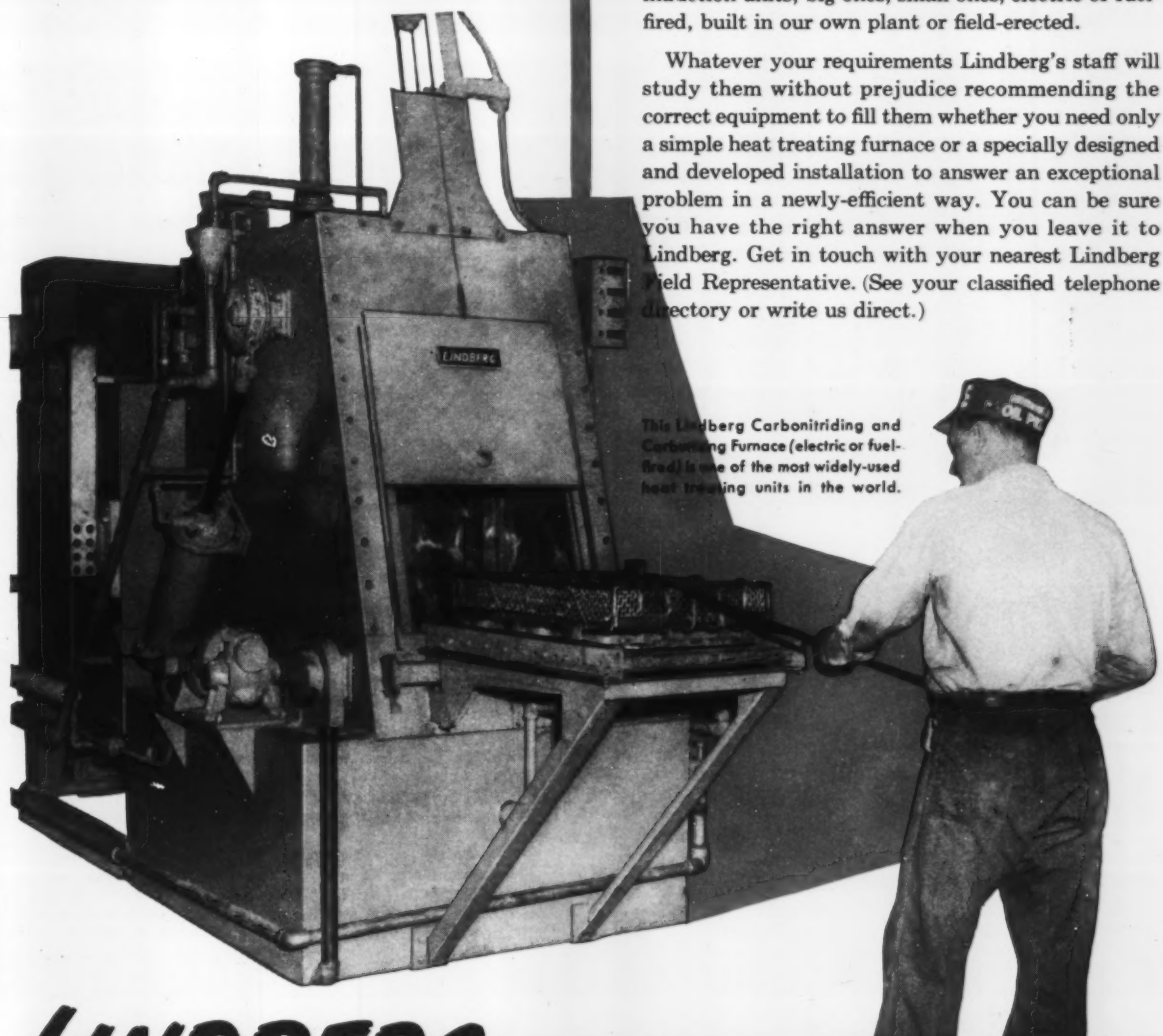

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Here's what steel Kaiser

COMPARATIVE ENDWALL TRIAL "... had inspected walls day prior to accident and noted Kaiser Periclase Chrome Metal Encased Brick sections were plumb, in line and tight whereas competitive sections were bowed and leaking."

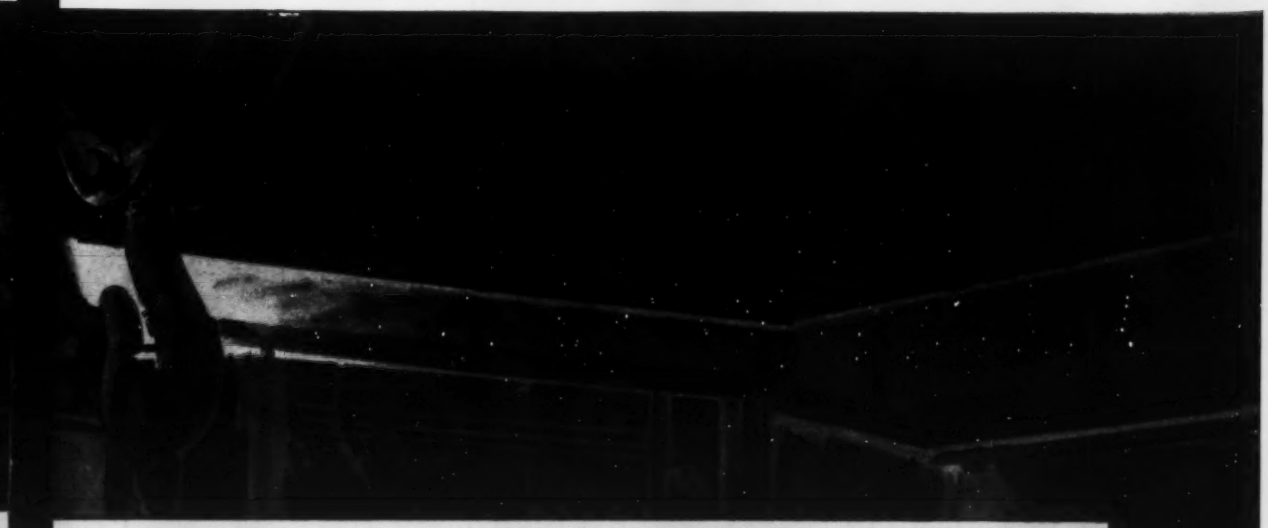
BACKWALLS "... having tremendous success with Kaiser Chrome Periclase Brick in backwalls ... on rebuild, gave instructions to leave it in for another campaign."

HOT TAP HOLES "... averaging between 20 and 25 heats with Permanente 165 on the 300-ton furnaces, where competitive mix previously gave 3 to 5 heats."

ENDWALLS "... Panels of Kaiser Periclase Chrome Metal Encased Brick went 402 heats while competitive panels in the same campaign were replaced at 265 heats."

BOTTOM PERFORMANCE "... Permanente 165 bottom has tapped 413 heats with delay figure of 3 minutes while competitive bottom - rammed five days earlier - has tapped only 360 heats with an average delay figure over bogey of 11 minutes."

ENDWALLS "... Furnace finished its third campaign using Kaiser Periclase Chrome Brick endwall for a total of 562 heats. Other furnaces using competitive brick usually lasted only 200 heats - one campaign."



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One of the most significant things about these statements from Kaiser Chemicals customers is that each of them illustrates a *new performance or production record* made possible by changing to a Kaiser Chemicals basic refractory product.

Why this uniform superiority?

Kaiser Chemicals refractories are *especially designed* for peak performance in specific applications in open hearth and electric steel furnaces. Each is a specially-developed composition . . . each is backed by more than 15 years of continuous research and development.

The uniform composition of Kaiser Chemicals refractories—your guarantee of dependability—is assured by Kaiser Chemicals fully-integrated facilities, controlling quality from initial production of sea water magnesia to assistance in final installation at your mill.

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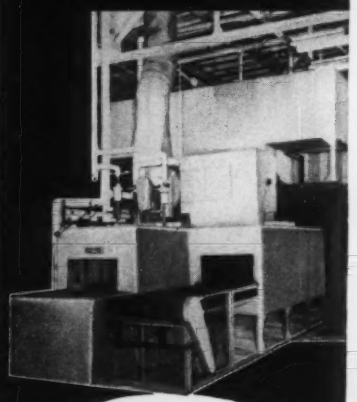

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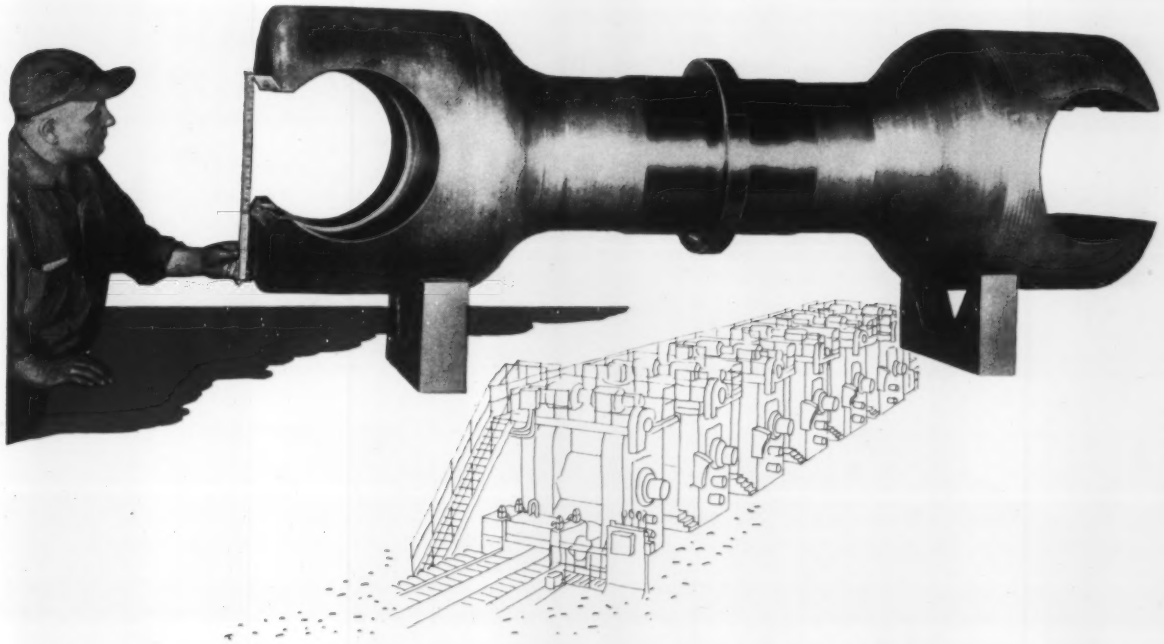

SAVE MONEY with FINKL FORGINGS

Strip mills do!

They increase life and therefore reduce "down time" with Finkl finish machined spindles, once again proving that the best costs the least in the long run.

A typical example is this 98″ spindle, weighing 5900 pounds, which began as a 13,000 pound forging from a 50,000 pound ingot out of our own melt shop. The utmost consideration for the spindle's end use set up the quality control program before the furnace electrodes started to arc. Then through forging, heat treating, rough and finish machining, and final inspection, each department head and his crew of craftsmen guided the program to its specified completion.

When you are considering cylinders, spindles, driveshafts, or any special purpose forging, whether rough turned or finish machined, call your local Finkl representative. He will be glad to help you plan, or call upon the more than 78 years of Finkl experience to save you money and give you the finest forgings, or die blocks, available.

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. . . 4 Major Features Increase Efficiency

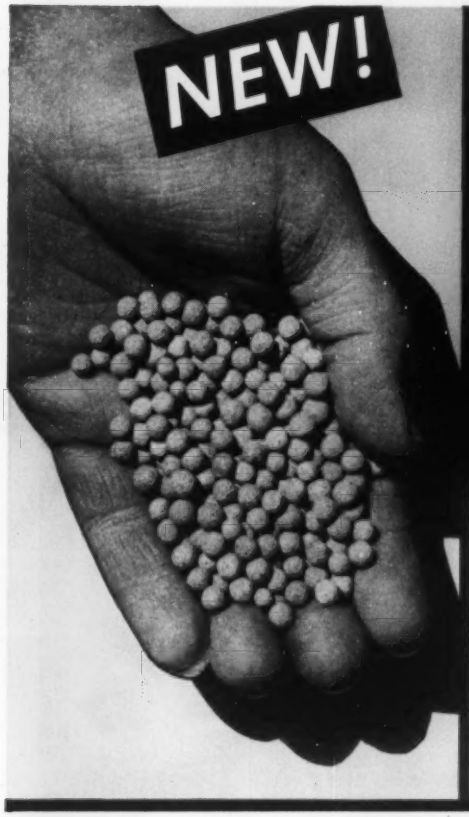
1. WIDE RANGE—Just three LANDIS Pipe Machines (2", 8" and 18") will thread all diameters of pipe from ½" to 18". Each machine is constructed so as to handle a wide range of pipe sizes—for example, the 6" machine will thread all diameters from 1" to 6". Universal size adjustment allows quick set-up.

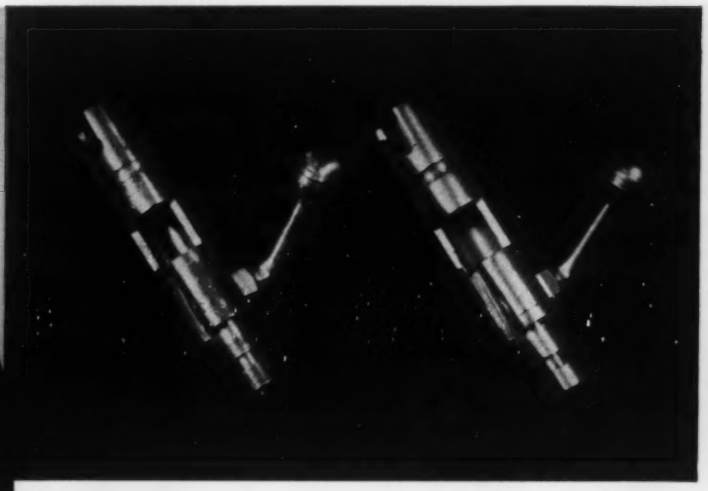
2. DIE HEAD EFFICIENCY—The design of Stationary heads provides maximum rigidity on all diameters within their range. Positive locking action is assured through a self-locking toggle joint. Size adjustment is quickly and easily obtained through the use of a single locking nut.

3. LOW TOOL COST—Chasers operate at a tangent to the work. Line contact at cutting edge reduces friction. Permanent throat assures even chip distribution. Variable rake affords proper cutting edge for different materials. Landis chasers are useable for 80% of their original length. They are individually replaceable and, within the range of a given die head, a single set can be used for all diameters of the same pitch, form and taper.

4. PRECISION TAPERED THREADS—The Receding Chaser Pipe Machines are especially designed to cut tapered threads to meet A.P.I. requirements. Chasers recede into the die head at a rate equal to the taper of the thread, ensuring accurate and uniform taper along the full thread length.

LANDIS *Machine* CO. WAYNESBORO PENNSYLVANIA





The new ALUNDUM Tumblex "S" abrasive rolls around and through intricate parts; brings high uniformity of radii and surfaces, with smooth finish, to the barrel-finishing of parts as intricate as this gun component. The "before and after" view shows you how the spheres improve external and *internal* areas.

Besides this 3/16" diameter size of Tumblex "S" you can order it in four other sizes, up to 1/8". This means top barrel-finishing performance for you, in many different applications. And these new spheres are exceptionally dense and long-lasting.

Another big advance in barrel-finishing

Norton Tumblex "S" abrasive spheres

From the pioneer of ALUNDUM bonded triangles — now, new bonded spheres to help you do a better job*

If you finish parts that have hard-to-contact recesses or intricate shapes, Tumblex "S" tumbling abrasive is the latest development.

Here are the reasons why tubing, coil springs, scissor handles, bearing retainers, pump bodies and many other parts benefit by the new shapes and sizes of Tumblex "S" — and its top-quality as a tumbling abrasive.

- *Tumblex "S" is made in spheres that easily get into areas where other abrasive shapes can't reach.*
- *Made of famous Norton ALUNDUM abrasive, it cuts fast — resulting in shorter time cycles and lower costs per piece finished.*

5 Different Diameter Sizes

#2—1/8"	#4—3/8"
#3—5/8"	#5—9/32"
#6—3/16"	

Send Your Work Samples

Let us demonstrate in our newly enlarged Sample Processing Department how Tumblex "S" Abrasive can give the value-adding "Touch of Gold" to your product quality and cut your barrel-finishing time and costs. NORTON COMPANY, Worcester 6, Mass. Distributors in all industrial areas, listed under "Grinding Wheels" in your phone book, yellow pages. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Massachusetts.

*Trade Mark Reg. U. S. Pat. Off. and Foreign Countries

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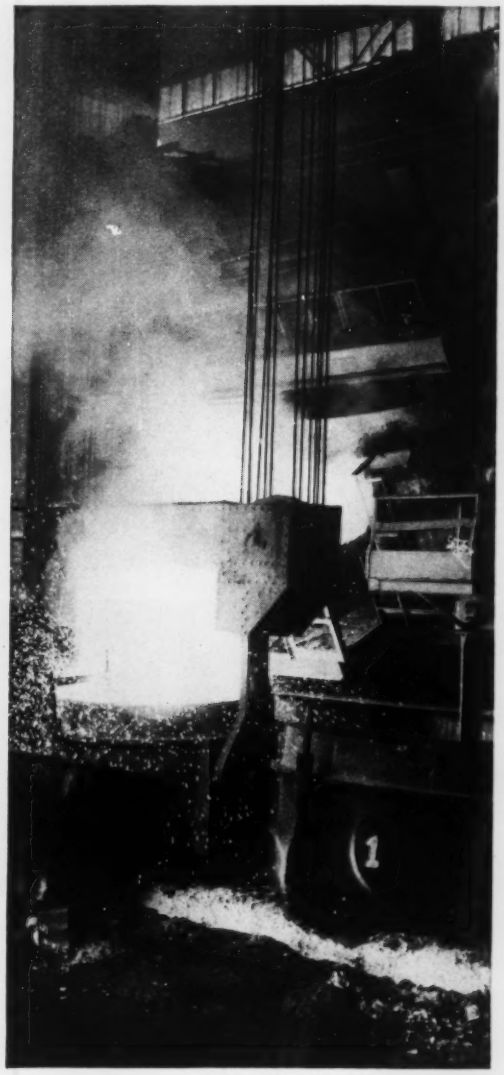

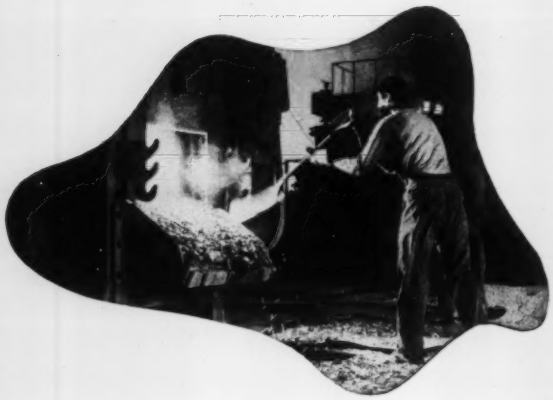

WHEN YOU MELT...

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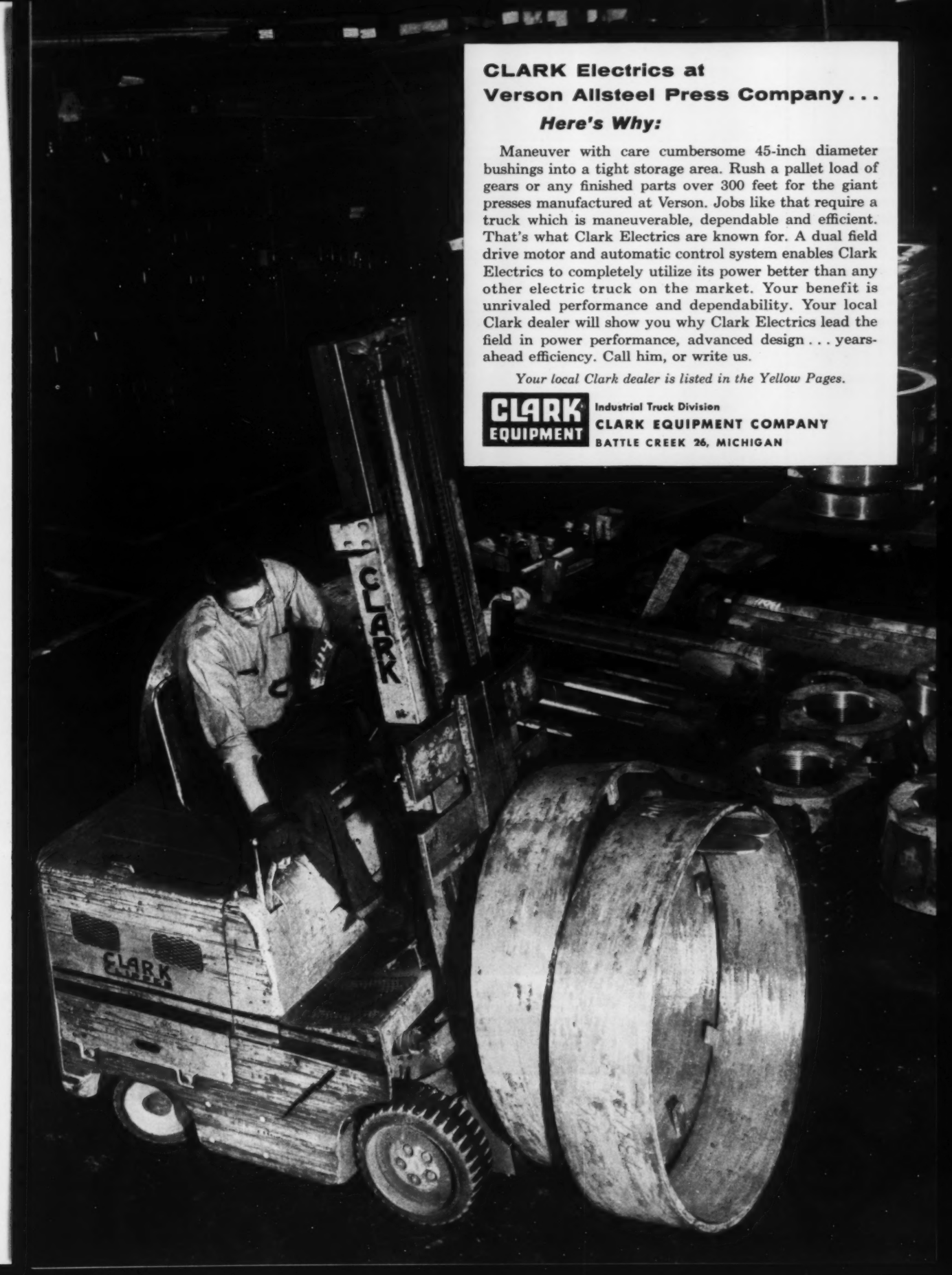
Northeastern Steel also melts with Lectromelt®

Two new MT Lectromelt Furnaces give Northeastern Steel Corporation of Bridgeport, Connecticut, an average daily capacity of 350 tons of alloy, tool and specialty steels.

Ideally located for serving the needs of New England, Northeastern Steel offers a complete range of carbon and stainless steels—*certified* high-grade alloys for exacting uses like antifriction bearings, aircraft and machine tool applications. These two Lectromelt Furnaces provide the flexibility and dependability which assure uniformly high-quality steels.

Lectromelt Furnaces are described in Catalog No. 9-A. For a copy, write Lectromelt Furnace Company, 323 32nd Street, Pittsburgh 30, Pa. *(a McGraw Edison Company Division).*



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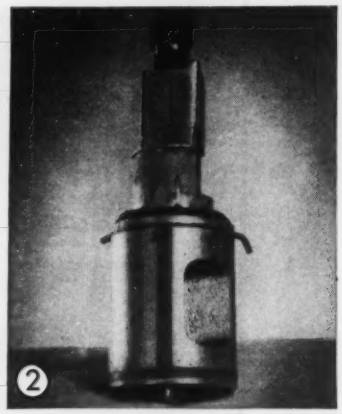
CLARK EQUIPMENT COMPANY
BATTLE CREEK 26, MICHIGAN

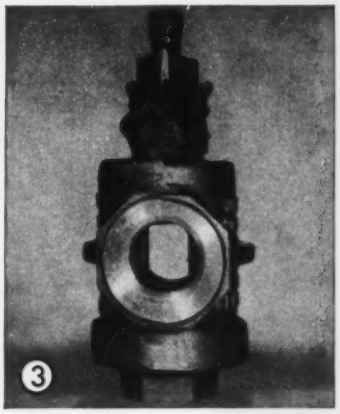
*SEE HOW *Controlled*
PRESSURIZED LUBRICATION
GUARANTEES LOWEST COST SERVICE FROM

HOMESTEAD *lubricated* PLUG VALVES

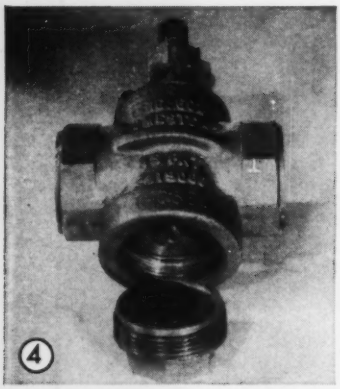
This plug was removed from a Homestead Valve just after starting lubrication, and before all sealing areas were filled with lubricant. Note that pressurized lubricant continues to extrude through feeder holes. Momentary downward movement of plug at start of each lubrication, gives assurance that plug is always free to turn.



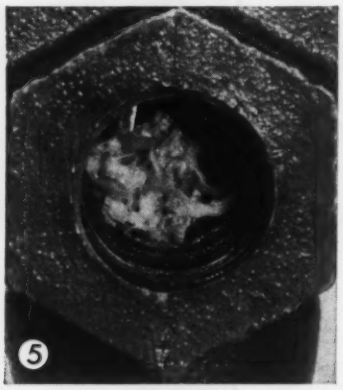
The plug was again withdrawn from the valve body just after a ring of lubricant around the stem indicated that the lubricant system was full. Note that all lubricant grooves are filled. The entire plug surface is coated with lubricant. Lubricant is well packed in the stem sealing area above the plug.



Now valve has been purposely over-lubricated as indicated by excess lubricant around stem. Note that with *controlled* pressurized lubrication there is no extrusion or seepage of lubricant into valve port opening. This means no waste, no contamination of line fluids, no clogging of low pressure lines with lubricant, or fouling of meters, orifices, etc.



Also, in the Homestead Valve with *controlled* lubrication, you will note that even though the valve has been over-lubricated, lubricant comes only to the bottom edge of the plug, and is not wasted by discharging in quantity into the bottom chamber.

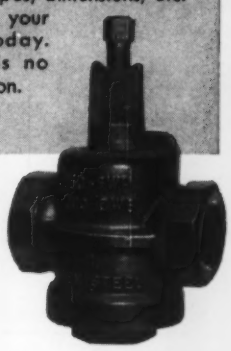


Now, see for yourself the risk involved when a valve which does *not* have Homestead's *controlled* Pressurized Lubrication, is over-lubricated. Note lubricant has been forced into the port opening. It can contaminate line fluids, foul meters or orifices, or even block low pressure lines!

* Unretouched photos.

These are but a few of the many advantages of Homestead's controlled pressurized lubrication that guarantee lowest cost valve service.

Reference Book 39-5 has the full story—twenty-eight pages of engineering facts, sizes, types, dimensions, etc. Ask for your copy today. There is no obligation.



HOMESTEAD LUBRICATED PLUG VALVE (Pat. Pend.)

HOMESTEAD VALVE MANUFACTURING COMPANY

P. O. Box 22 *"Serving Since 1892"* Coraopolis, Pa.

CALENDAR
OF MEETINGS

Feb. 25-Mar. 1, International Heating & Air Conditioning Exposition: International Amphitheatre, Chicago. Information: International Exposition Co., 480 Lexington Ave., New York 17, N. Y. President: E. K. Stevens.

Mar. 4-6, Association of Iron & Steel Engineers: Annual western meeting, St. Francis hotel, San Francisco, Calif. Association's address: 1010 Empire Bldg., Pittsburgh 22, Pa. Managing director: T. J. Ess.

Mar. 5-7, American Machine Tool Distributors Association: Spring meeting, El Mirador hotel, Palm Springs, Calif. Association's address: 1900 Arch St., Philadelphia 3, Pa. General manager: James C. Kelley.

Mar. 5-7, Society of Automotive Engineers Inc.: National passenger car, body and materials meeting, Sheraton-Cadillac hotel, Detroit. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: John A. C. Warner.

Mar. 6-8, Pressed Metal Institute: Annual spring technical meeting, Carter hotel, Cleveland. Institute's address: 3673 Lee Rd., Cleveland 20, O. Managing director: H. A. Daschner.

Mar. 10-13, National Association of Waste Material Dealers Inc.: Annual convention, Conrad Hilton hotel, Chicago. Association's address: 271 Madison Ave., New York 16, N.Y. Managing director: Clinton M. White.

Mar. 11-15, National Association of Manufacturers: Institute on industrial relations, Hollywood Beach hotel, Hollywood, Fla. Association's address: 2 E. 49th St., New York 17, N.Y. Information: Sybyl S. Patterson, associate director, Industrial Relations Division, National Association of Manufacturers.

Mar. 11-15, 1957 Nuclear Congress: Convention Hall, Philadelphia. Co-ordinator: Engineers Joint Council, 29 W. 39th St., New York 18, N.Y.

Mar. 13-15, National Fluid Power Association: Annual meeting, Hollywood Beach hotel, Hollywood, Fla. Association's address: 1618 Orrington Ave., Evanston, Ill. Executive secretary: Barrett Rogers.

Mar. 13-15, Radio-Electronics-Television Manufacturers Association: Spring meeting, Sheraton Park hotel, Washington. Association's address: 777 14th St. N.W., Washington 5, D.C. Secretary: James D. Secrest.

Mar. 14-15, National Industrial Conference Board: Atomic energy conference, Benjamin Franklin hotel, Philadelphia. Board's address: 460 Park Ave., New York 22, N.Y. Secretary: Herbert S. Briggs.

Mar. 17-19, Steel Founders' Society of America: Annual meeting, Drake hotel, Chicago. Society's address: 606 Terminal Tower, Cleveland 13, O. Secretary: George K. Dreher.

Mar. 18-21, Society of the Plastics Industry Inc.: Annual national conference and plastics exposition, Biltmore hotel and Shrine Hall, Los Angeles. Society's address: 250 Park Ave., New York 17, N.Y. Executive vice president: William T. Cruse.

Mar. 18-21, American Society of Mechanical Engineers: Gas turbine power conference, Sheraton-Cadillac hotel, Detroit. Society's address: 29 W. 39th St., New York 18, N.Y. Secretary: C. E. Davies.

Mar. 20-22, Society of Automotive Engineers Inc.: National production meeting and forum, Hotel Statler, Buffalo. Society's address: 485 Lexington Ave., New York 17, N.Y. Secretary: John A. C. Warner.

Mar. 25-27, American Society of Tool Engineers: Annual meeting, Shamrock hotel, Houston. Society's address: 10700 Puritan Ave., Detroit 21, Mich. Executive secretary: Harry E. Conrad.

Mar. 25-29, Western Metal Congress & Exposition: Biennial exposition, Pan-Pacific Auditorium, Los Angeles. Information: American Society for Metals, 7301 Euclid Ave., Cleveland 3, O. Managing director: William H. Eisenman.

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Companion machines that help each other and can help you!

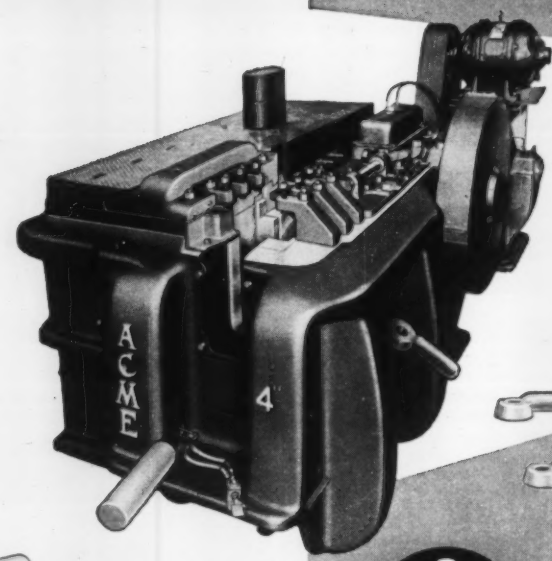
HILL ACME No. 700 BAR-BILLET shear
(Ask for Bulletin B-B)

HILL ACME BAR-BILLET SHEAR

A totally new conception of efficiency in clean, square cuts on bars or billets. Now proven in operation throughout the country. Made in several sizes for cutting stock from 1" to 6" in diameter.

ACME XN FORGING MACHINE

The new, improved ACME XN Forging Machine with its massive, sturdy construction is built to withstand the destructive influences present in all forging machine operations. ACME XN Forging Machines will keep going for long uninterrupted periods, producing accurate, clean forgings at a rate never thought possible a few years ago. A bulletin describing details plus a series of 18 technical articles on modern forging practice will be sent upon request.



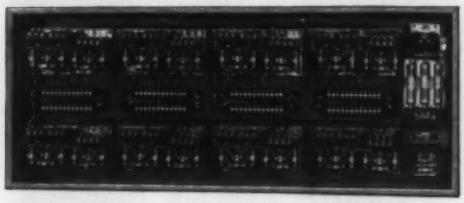
The HILL ACME Company

1207 W. 65th STREET • CLEVELAND 2, OHIO

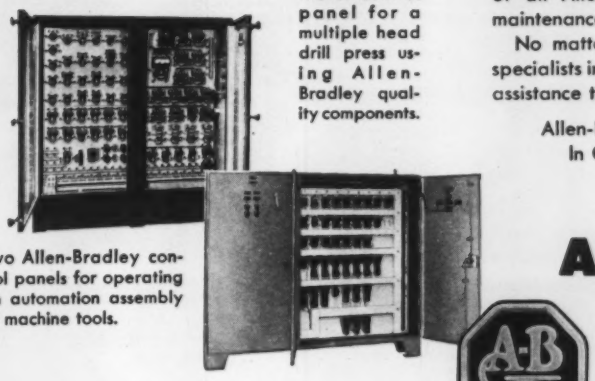
Manufacturers of: "ACME" FORGING • THREADING • TAPPING MACHINES • "CANTON" ALLIGATOR SHEARS • BAR-BILLET SHEARS
"HILL" GRINDING & POLISHING MACHINES • HYDRAULIC SURFACE GRINDERS • "CLEVELAND" KNIVES • SHEAR BLADES

for trouble free operation—

let ALLEN-BRADLEY build your Special Control Panels



Motor control panel for a multiple head drill press using Allen-Bradley quality components.



Two Allen-Bradley control panels for operating an automation assembly of machine tools.

When the control panel furnished with your production machine carries the Allen-Bradley trademark of QUALITY, your customer's approval is assured! That is why so many leading machinery builders have standardized on Allen-Bradley controls. The "simple design" of all Allen-Bradley controls is your guarantee of trouble and maintenance free service.

No matter how complex your control requirements may be, as specialists in this field, Allen-Bradley's experience may be of valuable assistance to you. Call your nearest A-B office.

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.
In Canada—Allen-Bradley Canada Ltd., Galt, Ont.

ALLEN-BRADLEY

QUALITY

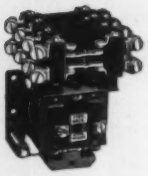
MOTOR CONTROL

A-B Quality

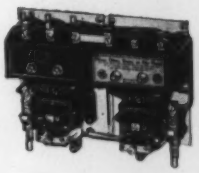
3-57-R

"we'll use ALLEN-BRADLEY Quality Motor Control ...it's trouble free!"

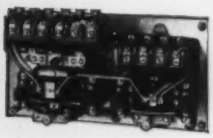
SPECIFY THESE RELIABLE MOTOR CONTROL UNITS



Bulletin 700
Universal Relay with
N.O.—N.C. Contacts

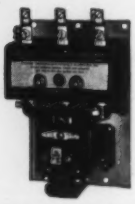


Bulletin 705 Size 2
Reversing Starter

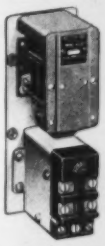


Bulletin 715 Two
Speed Consequent
Pole Starter

Bulletin 802T Adjustable
Lever Oiltight Limit
Switch

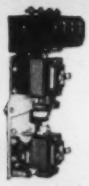


Bulletin 702 Three Pole
Size 2 Contactor

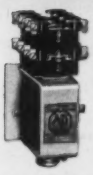


Bulletin 849 "On-Delay"
Pneumatic Timer

Bulletin 892
Handy Terminal
Blocks



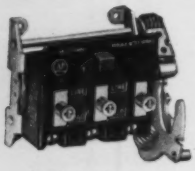
Bulletin 704, Mechanically
Held, Hum-free Relay



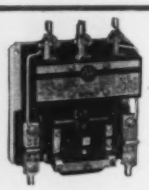
Bulletin 200
D-C Relay

Bulletin 350
Reversing Drum Switch

Bulletin 836
Pressure Control in
NEMA Type 4 Enclosure

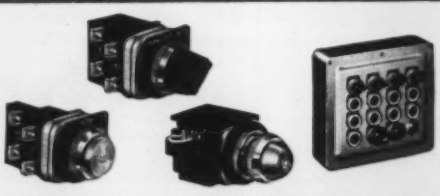


Bulletin 894
Visible Blade
Disconnect Switch



Bulletin 709
Size 4 Automatic
Starter

Bulletin 609
Three Phase
Manual Starter



Oiltight Push Button, Selector Switch, Press-to-Test
Pilot Light, and completely assembled Oiltight Station

Allen-Bradley *quality* components assure you millions of trouble free operations. The simple design, maintenance free, double break, silver alloy contacts, and rugged design features have made them the first choice among design engineers, contractors, and maintenance men. You just can't go wrong with this QUALITY line.

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.
In Canada—Allen-Bradley Canada Ltd., Galt, Ont.

Send for your copy of the new 7th edition of the Allen-Bradley Handy Catalog

3-57-MR

Roebling Royal Blue Wire Rope will take **shock** after **shock** after **shock!**

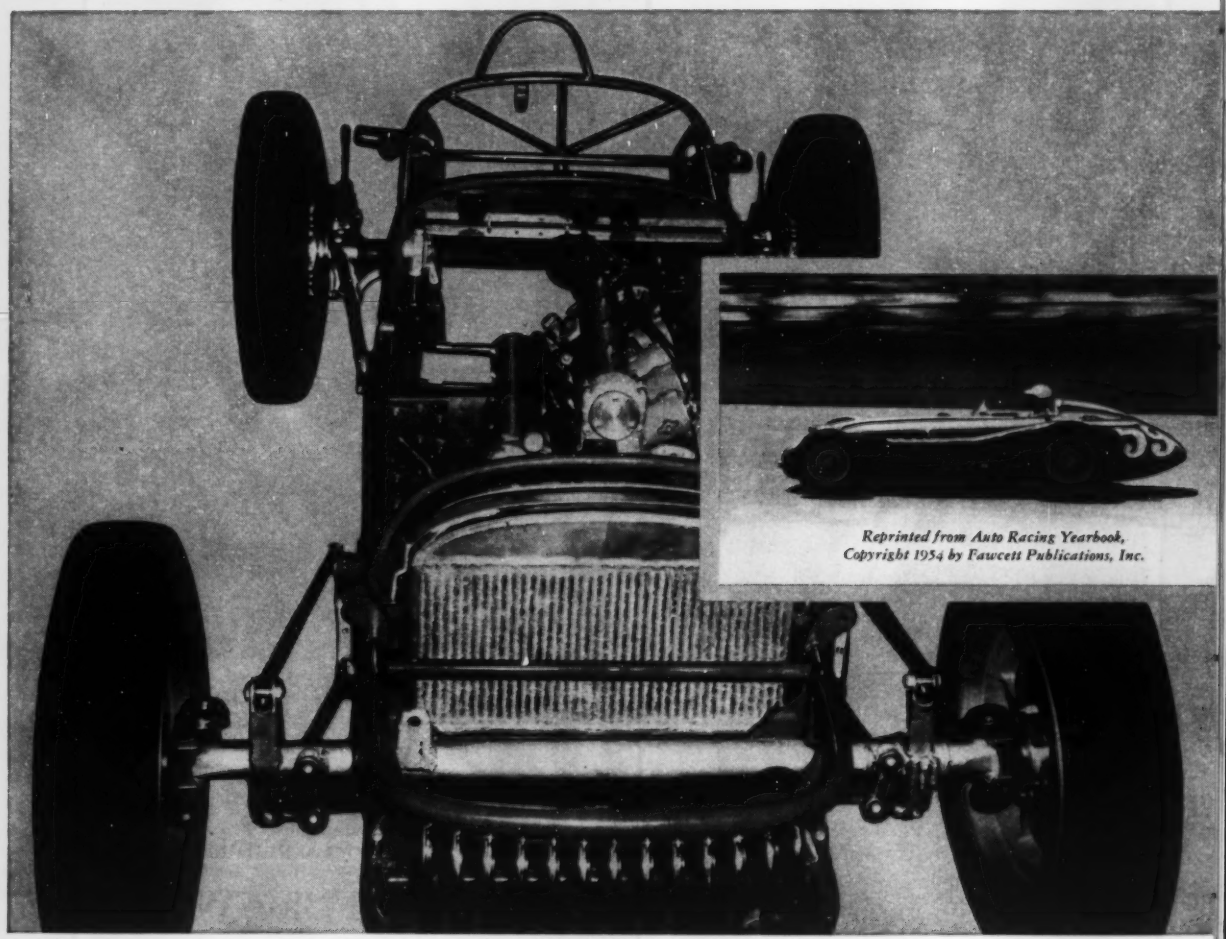
This, and the fact that Royal Blue is stronger than the strongest you have been using, has helped to make it the most widely favored rope in Roebling's history. It will work hard and last longer on *your* job. Your distributor or Roebling Sales Office will give you full information, or write: John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

ROEBLING

Distributors, Branches and Warehouses Throughout the Country
Subsidiary of The Colorado Fuel and Iron Corporation

WHEN IT'S *MOVING*...MAKE IT *TUBING*

Pound for Pound, Tubular



The body frame of this high-performance racing car is fabricated from steel tubing to obtain maximum strength at reduced weight.

REPUBLIC

REPUBLIC STEEL

World's Widest Range of Standard Steels

Construction is STRONGEST!

That's why racing-car designers and builders fabricate body frames from steel tubing. A combination of high speed and rugged endurance demands a framework that is both lightweight and strong.

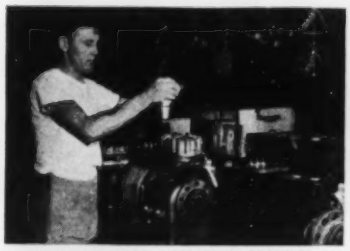
They know that at any given weight, tubing is the strongest of all mechanical shapes—stronger in torsion, stronger as a beam, stronger under compressive loads.

When it comes to a choice, remember: The most economical steel mechanical tubing, dollar for dollar, is Republic ELECTRUNITE®, the *original* electric resistance welded tube. Recognized throughout industry for its exceptional quality, Republic ELECTRUNITE is available in a wide variety of forms, sizes and gages—in both carbon and stainless steels.

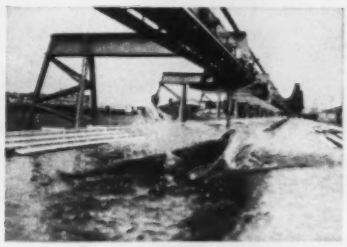
Though produced in great volume, every foot in every shipment of ELECTRUNITE tubing is *consistently uniform,* including wall thickness, ductility and concentricity. Surfaces are free from scratches and pit marks. Response to heat treatment is uniform. And it is easy to bend, work with . . . often eliminates costly fabricating or machining operations.

If strength, lightness, safety are requirements in your product, investigate Republic ELECTRUNITE Steel Tubing. Our engineers will help you with design problems, show you the way to greater economies and profits. Send coupon for facts.

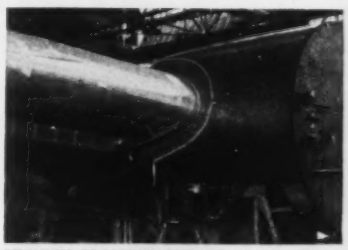
MORE REPUBLIC PRODUCTS MADE FOR MOVEMENT:



CYCLIC COMPRESSOR OPERATION REQUIRES AN ABSOLUTE SEAL at the joint between compressor cylinder and head. Republic Alloy Steel Hex Head Cap Screws are made to order for this application because they neither stretch nor lose their grip under the heating and cooling cycle of on-off operation. In fact, they more than meet tensile strength, yield point, hardness and ductility requirements. Republic makes 20,000 standard and 8,000 special types of headed and threaded products for every application. Send coupon for full information.



STRONG RESISTANCE TO CORROSION, WEAR AND ABRASION make Republic Cold Finished Stainless Steel Bars ideal for this unique application. It's a testing tank for advance-type seaplane hulls. Testing is conducted by suspending hull model from carriage which rolls on Republic Stainless Steel Bars. Besides ease of maintenance, these bars provide higher tensile and yield strength, close tolerance, and a fine surface finish, permitting smooth, accurate operation of testing device. Republic metallurgists and engineers will help you apply stainless steel to your present and future work.



TITANIUM PROVIDES STRENGTH AND WEIGHT-SAVINGS in aircraft such as the DC-7. Republic is an old hand at this high strength-to-weight business. We pioneered the use of alloy steels, then stainless steels—followed by high strength steels. Now come Republic Titanium and Titanium Alloys. Years of experience gained in helping hundreds of manufacturers design and re-design their products to get more strength with less weight are available to you. To get more information on how corrosion-resistant titanium can solve many problems, send coupon.

STEEL

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Please send more information on:

☐ Mechanical Steel Tubing ☐ Stainless Steel
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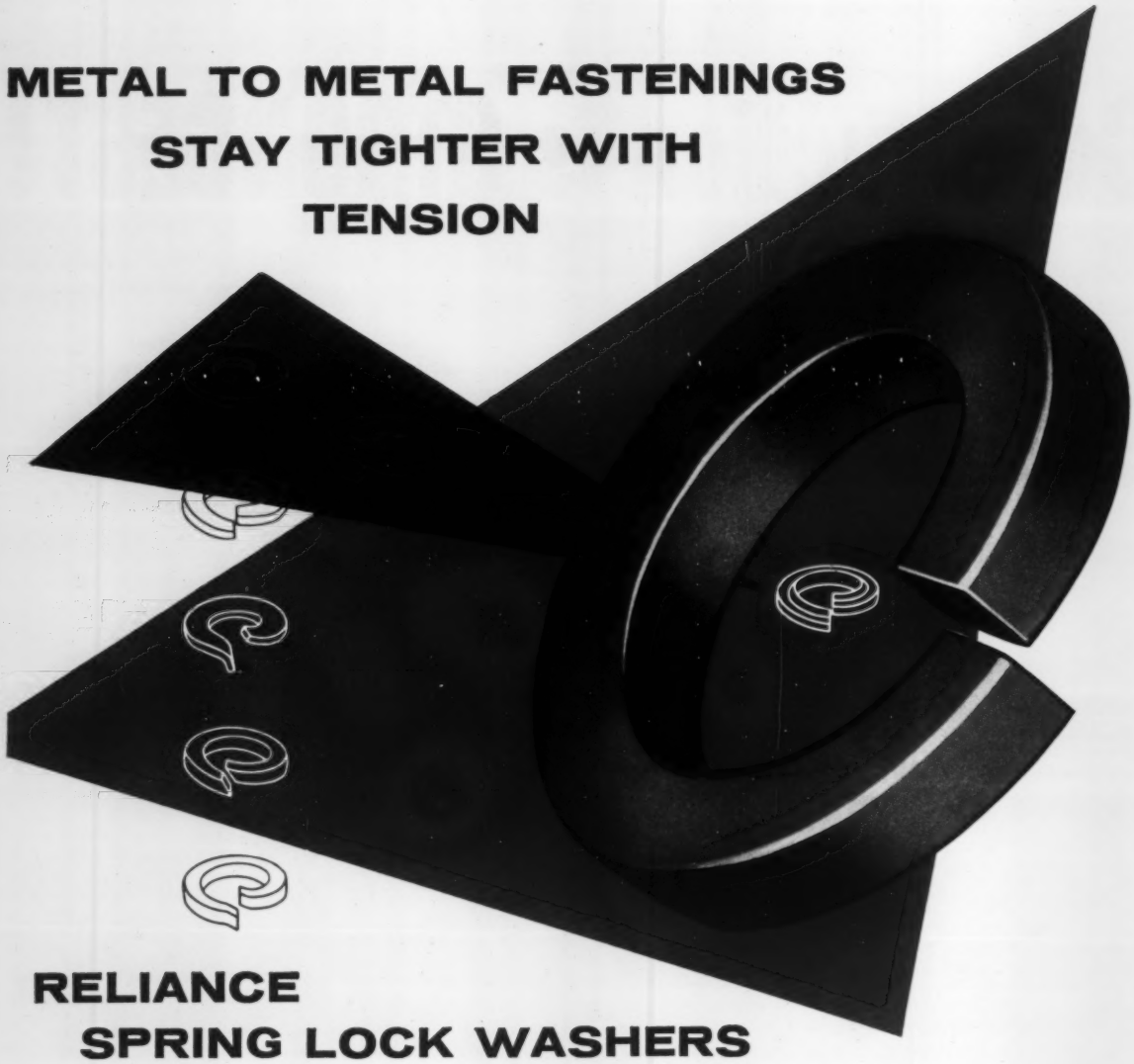
METAL TO METAL FASTENINGS STAY TIGHTER WITH TENSION



RELIANCE SPRING LOCK WASHERS

Metal products assembled by the tried and true nut/bolt method need more than just tight fastenings at the end of the production line. This especially is true of products subject to movement, vibration, stresses and strains. Metal wears, bolts stretch; and a fastening can become loose even though the nut doesn't turn. One solution to this problem is the application of constant tension to the assembly supplied by Reliance Helical Coil Spring Lock Washers.

These are the same high quality Spring Lock Washers on which the metal working industry has depended for forty-two years. They are made of cold drawn spring steel and are quality controlled throughout the manufacturing operation.

Your industrial distributor is a close source of supply for all types of top quality Reliance Spring Lock Washers. Send for free Engineering Bulletin W-50.

EATON

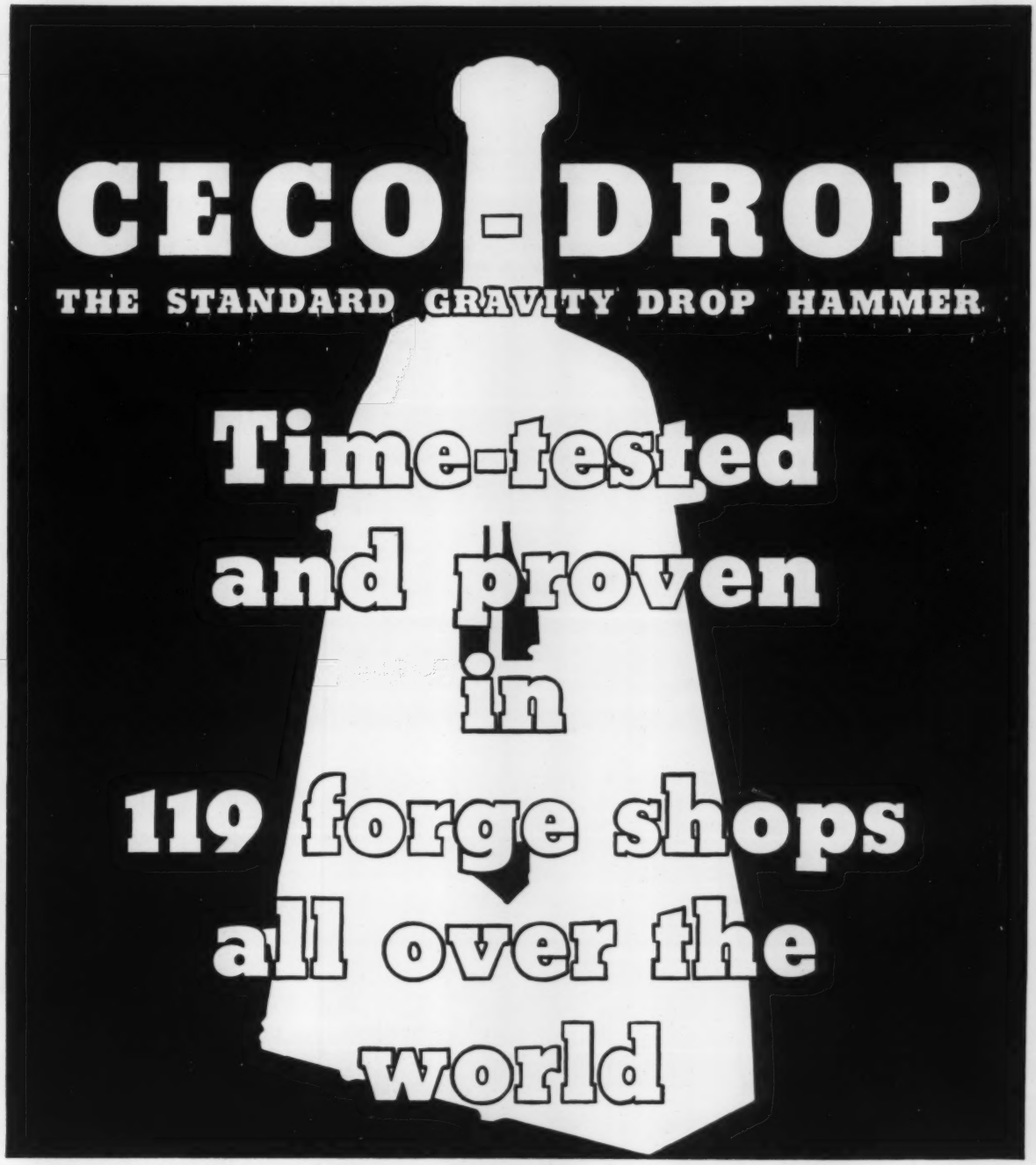
RELIANCE DIVISION

MANUFACTURING COMPANY

514 CHARLES AVENUE • MASSILLON, OHIO

SALES OFFICES: New York • Cleveland • Detroit • Chicago • St. Louis • San Francisco • Montreal

PRODUCTS: Sodium Cooled, Poppet, and Free Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Rotor Pumps • Motor Truck Axles • Permanent Mold Gray Iron Castings • Heater-Defroster Units • Snap Rings Springtites • Spring Washers • Cold Drawn Steel • Stampings • Leaf and Coil Springs • Dynamatic Drives, Brakes, Dynamometers



CHAMBERSBURG

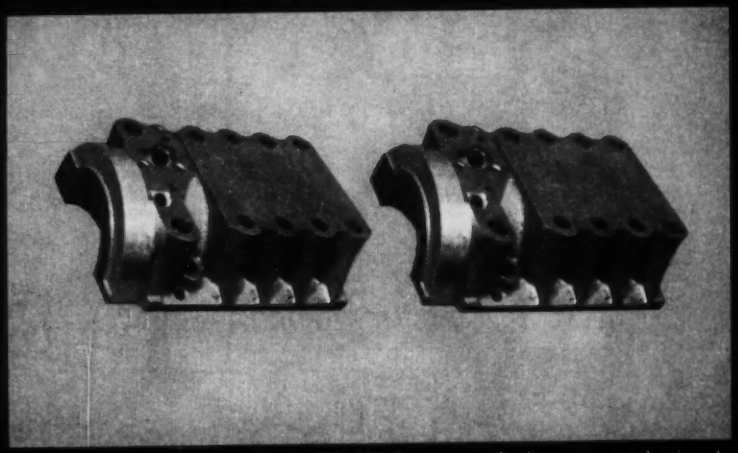
THE HAMMER BUILDERS

Made by the BUILDERS of THE IMPACTER

CHAMBERSBURG ENGINEERING CO., CHAMBERSBURG, PA.

THREE NEW DEVELOPMENTS
Increase Production

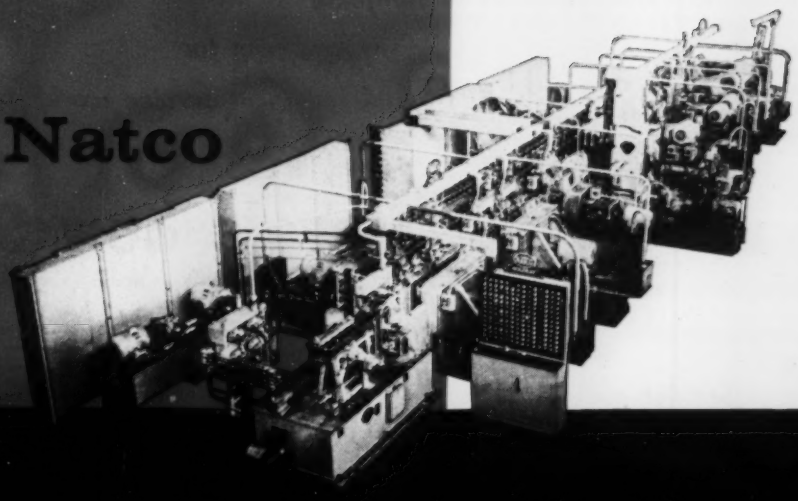
2-at-a-time processing



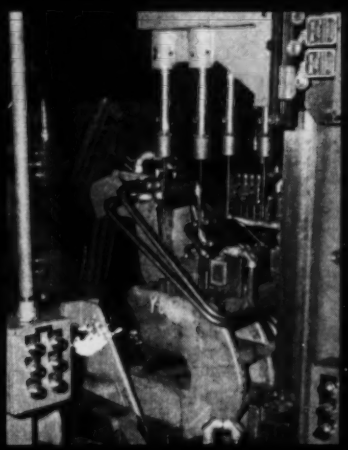
300 HP Natco greatly increases production by processing two complete sets of bearing caps at once.

Bearing caps—240 *sets* per hour—six times the production rate of the machine replaced! This new Natco processes two complete sets at once. It loads surface-broached castings automatically, performs 80 machining operations, places matched sets of finished bearing caps on the assembly conveyor. In addition to broaching and sawing, this 300 HP, 27-station Natco, drills, reams taps, turns, mills, probes and faces.

help this Natco 600%

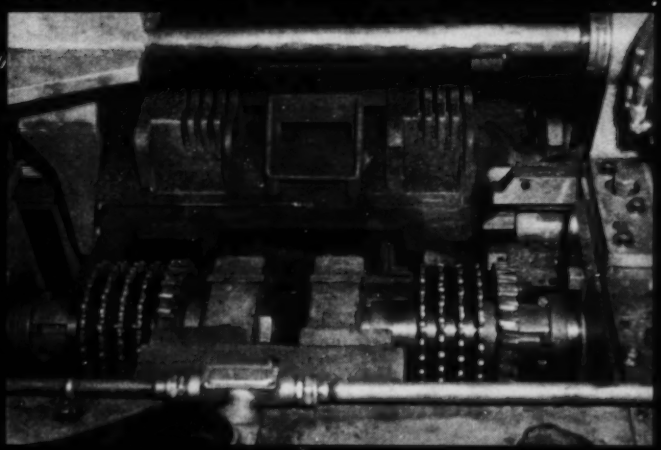


Unique Broaching Station



Fully automatic broaching station eliminates need for withdrawing broaching tools after cut. Broaching tools are pulled completely through hole, removing .030" stock.

New Rigid Saw Station



80 HP sawing station cuts two castings into complete sets of 5 caps each. All surfaces parallel within .0015". Fixture feeds castings into stationary mounted saws, providing rigidity for accurate 14 ipm cutting.

Whatever your high production problem, our engineers will work closely with your people to develop exactly the method and the machine to do your job best. Besides special way-type, index and transfer machines, Natco also builds multiple drilling, boring, facing and tapping machines. Call your nearest Natco office in Chicago, Detroit, Buffalo, New York, Boston, Philadelphia, Cleveland and Los Angeles. Distributors in other cities.

Partners in Production

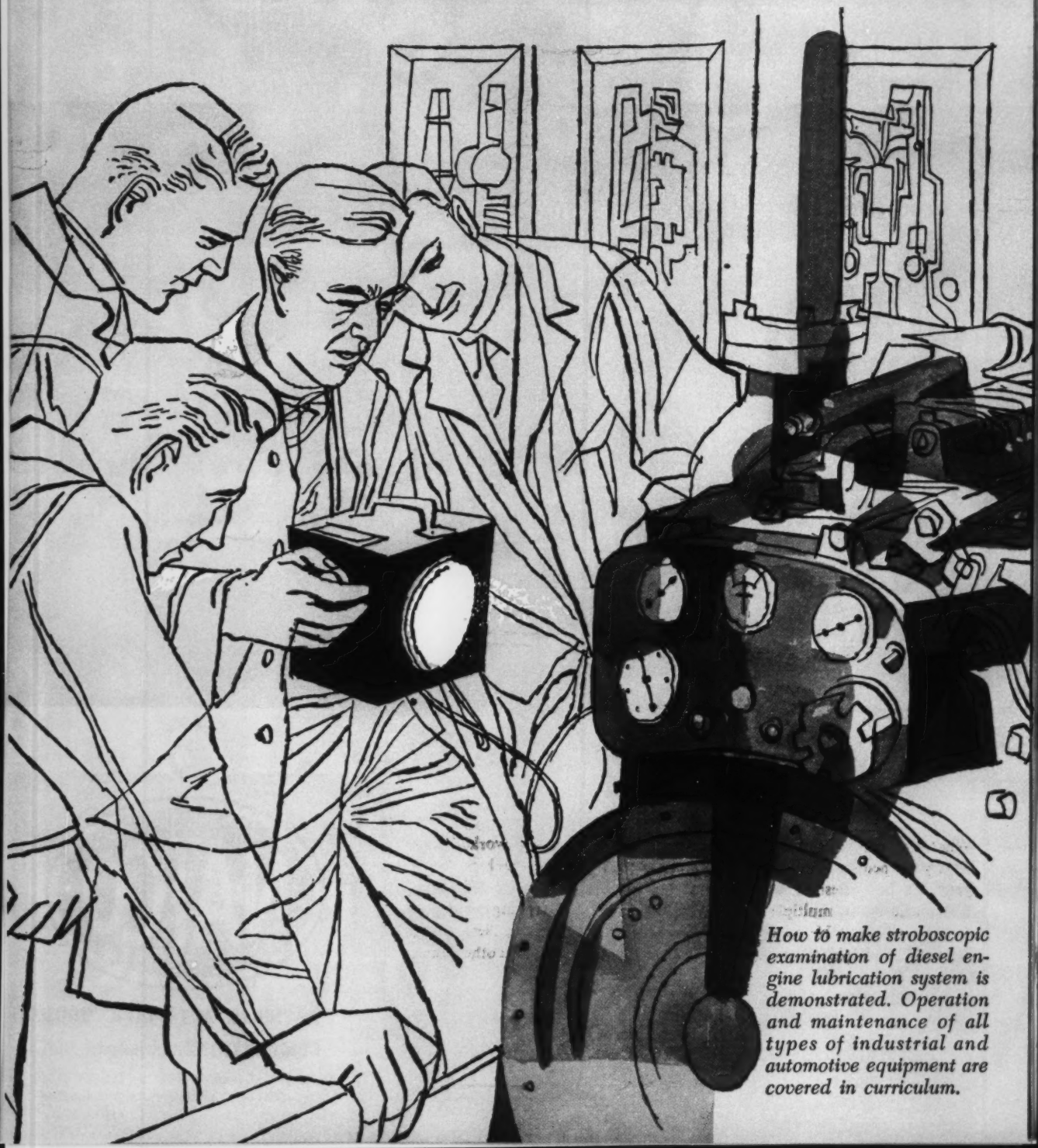
NATCO

NATIONAL AUTOMATIC TOOL COMPANY, INC. *Richmond, Ind.*

Ask for information about the PAYD (Pay-As-You-Depreciate) Finance Plan

How does an oil company
prepare men for
industrial technical service work?

Here's how Standard Oil



How to make stroboscopic examination of diesel engine lubrication system is demonstrated. Operation and maintenance of all types of industrial and automotive equipment are covered in curriculum.

Lectures, shop and lab work comprise training course.

trains its men

At the Standard Oil training center on Chicago's south side—not far from the Company's refinery and research laboratory at Whiting, Indiana—men who have demonstrated an aptitude for such work are given a 17 week course in industrial lubrication, equipment maintenance and metal working. And thus begins the training Standard Oil gives its men who are to provide technical service to customers.

Most men selected for this Sales Engineering School have college degrees in some engineering or scientific field. And in most cases these men, prior to attending the school, have had field experience in technical service work to start them off with an appreciation of the problems industry meets in lubricating equipment and working with metal.

This course for lubrication specialists and engineers includes lectures and work in chemical laboratory, engine laboratory and machine shop. Senior Standard Oil men, recognized authorities on lubrication and metal working, are the instructors. Other Standard Oilers with teaching skills and years of field experience, direct the shop work and supervise the school's laboratories.

Class, shop and lab work are augmented by field trips to plants where "students" learn first-hand more about the lubrication problems confronting industrial customers.

The Standard Oil Sales Engineering School has graduated 15 of these classes. The many men who have completed the course are now serving customers out of Standard's 23 offices in fifteen Midwest and Rocky Mountain states. Would you like one of these men to call on you? Then telephone your nearby Standard Oil office. Or write Standard Oil Company, 910 S. Michigan Ave., Chicago 80, Ill.

STANDARD

STANDARD OIL COMPANY
(Indiana)

Testing and comparing bearing lubrication methods.

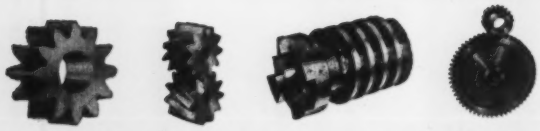
Kinematic viscosimeter is used to test viscosity of lube oil. C. S. Brown (right) learns to run test. Brown, like many classmates, has science degree.

FUN! with Scott-Atwater's fleet of 9 new outboards

with help from SEWALL GEARS

Outboarding at its exciting best . . . with a model for every need from 3.6 h.p. to 40 h.p. . . . that's Scott-Atwater's new fleet with features such as . . . Raymond Loewy design . . . new color choice . . . "Aquamute" exhaust . . . "Bail-A-Matic" . . . and many others including *full gear shift* with help from Sewall Gears for rugged, dependable service.

Sewall's complete gear service can help you . . . *call us!*



Custom-made gears and sprockets

Sewall gears are made by men who are fussy about specifications. We work in strict accordance with your prints. Gears must be delivered as scheduled. Price must be reasonable. We maintain a wide range of late-model machine tools, inspection instruments and checking equipment to serve our customers across the nation.

Let us quote on *your* specifications!

Write for NEW Bulletin No. A-111

The Sewall Story . . . 4 pages richly illustrated with in-plant photos . . . includes listing of capacities and facilities.

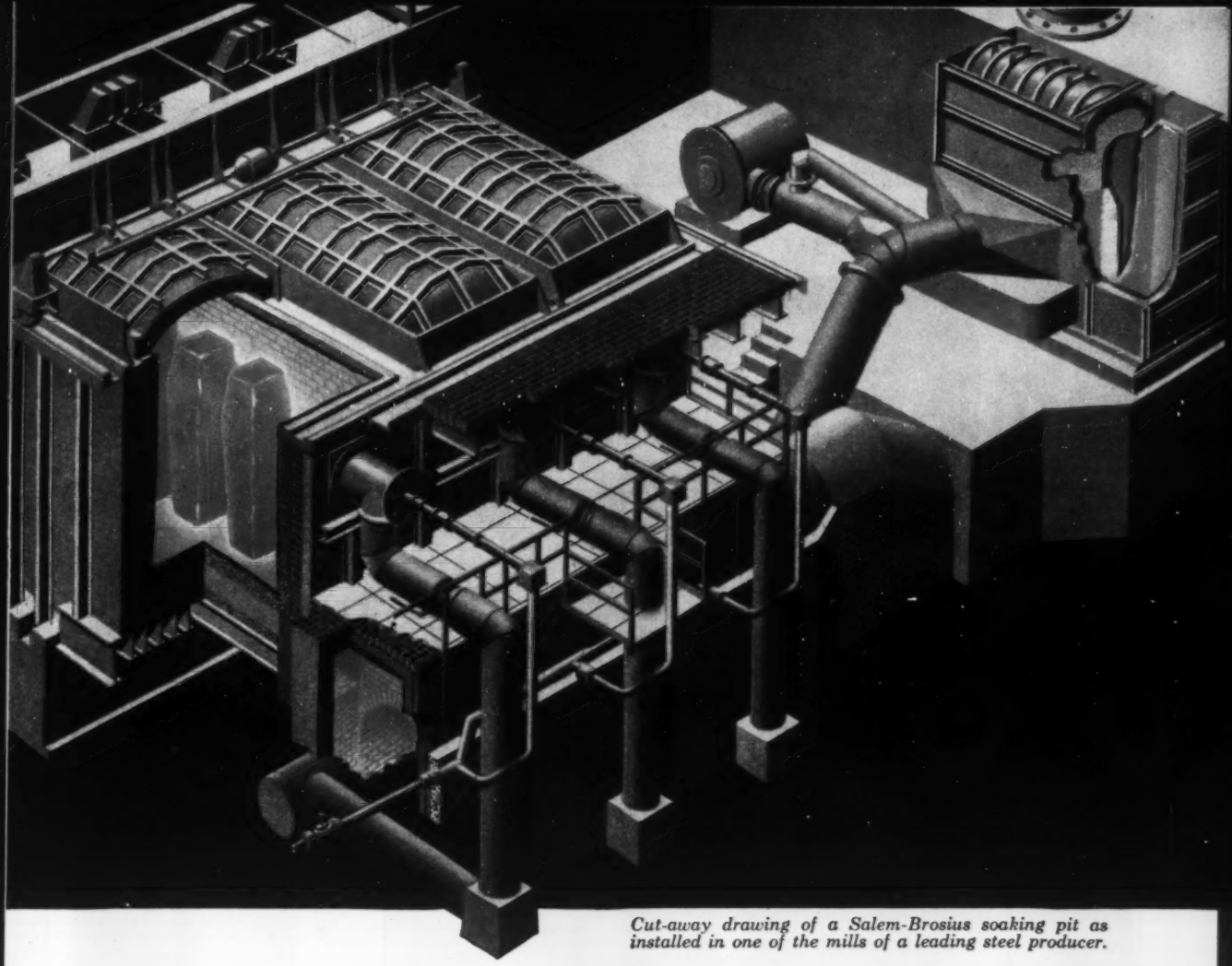
RACKS

available immediately!

We stock Standard Rack sizes from 48 D.P. to 3 D.P. in 6 ft. lengths. Write for PRICE LIST No. SR541 of Racks in Stock.

SEWALL GEARS

E. B. SEWALL Manufacturing Company, 705 Raymond Avenue, St. Paul 14, Minn., Midway 5-7721



Cut-away drawing of a Salem-Brosius soaking pit as installed in one of the mills of a leading steel producer.

Users are the best salesmen of Salem-Brosius soaking pits

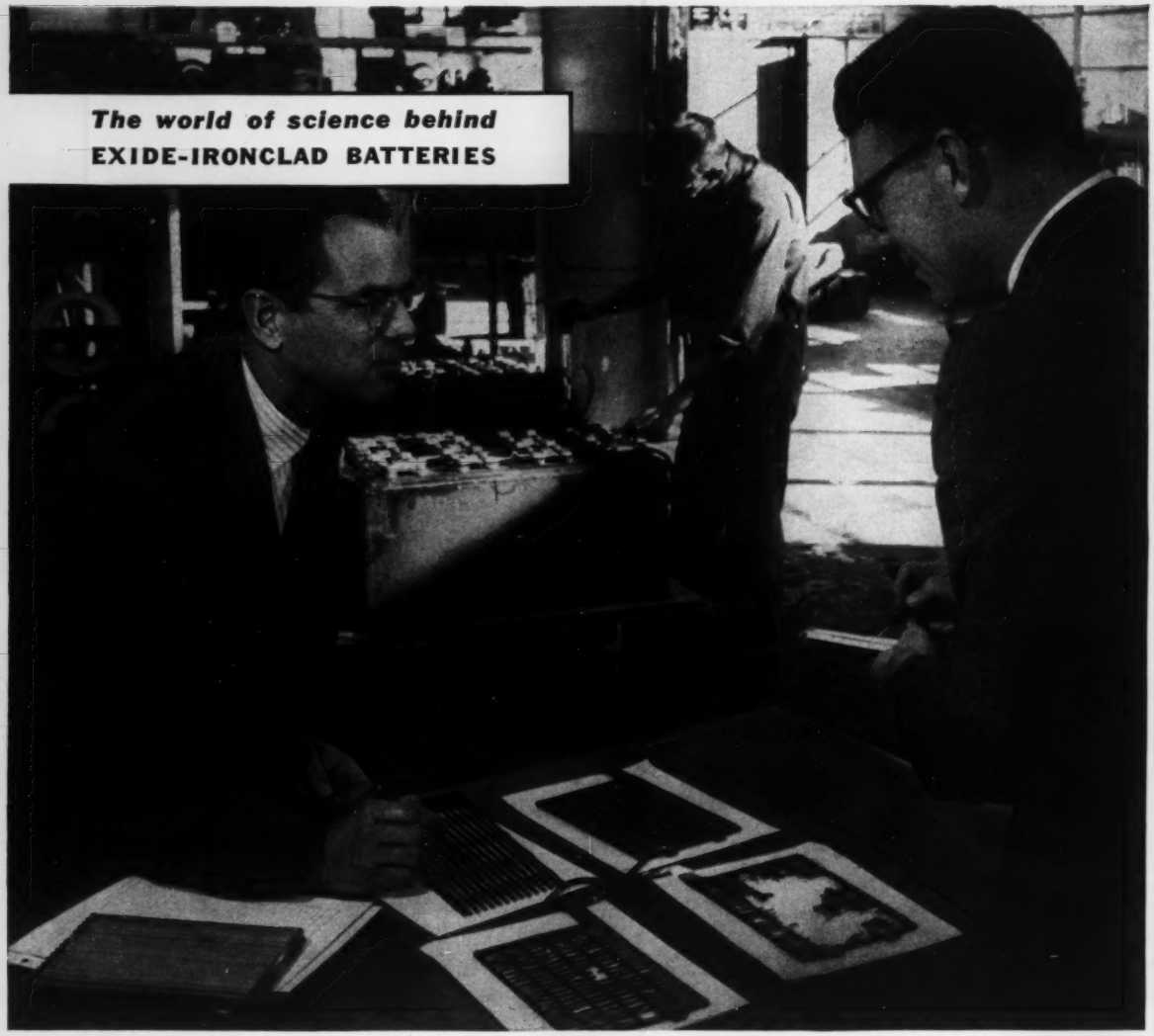
"We have again specified Salem-Brosius soaking pits for our expansion program," reports an operating official of a major steel company using pits installed by several manufacturers. "The previous installation heated more steel ingots ready for rolling with less fuel consumption, less maintenance cost, and better temperature uniformity than any other type of pit in our plant."

Reports like this are typical, not only about soaking pits, but all other Salem-Brosius heating and heat-treating furnaces as well. Salem-Brosius engineers, both here and abroad, possess an enviable record for designing furnaces which produce maximum, high-quality output at minimum operating cost. If your expansion or modernization plans call for ingot soaking pits or any other heating or heat-treating furnaces, Salem-Brosius, Inc. would appreciate an inquiry.

SALEM-BROSIUS, INC.

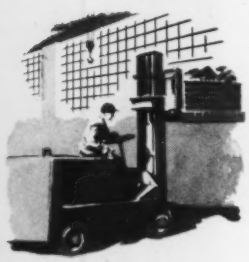
CARNEGIE, PENNSYLVANIA

In Canada: Salem Engineering Ltd., 1525 Bloor Street West, Toronto, Ontario


The world of science behind
EXIDE-IRONCLAD BATTERIES

Being interviewed is W. W. Smith, Divisional Manager, Product Engineering. Grids in back are of Exide's exclusive Silvium. Those in front are ordinary alloys.

"All of these alloys had the same acid test"



At the Exide Laboratories—**Reporter:** Was it a typical charge-discharge test normally used to test battery components?

Smith: Right. And the two positive plate grids with no visible signs of corrosion are Exide's patented Silvium alloy.

Reporter: How about the others—what alloys are they?

Smith: They're standard alloys used in other well-known makes of batteries. But they don't have Silvium's corrosion-resisting ingredients.

Reporter: Where is Silvium used?

Smith: In the positive plates of all Exide-Ironclad and many other Exide Batteries.

Reporter: How does it affect battery performance?

Smith: Every test we've made proves it stretches battery life because the grid resists corrosion—sometimes up to 100% longer.

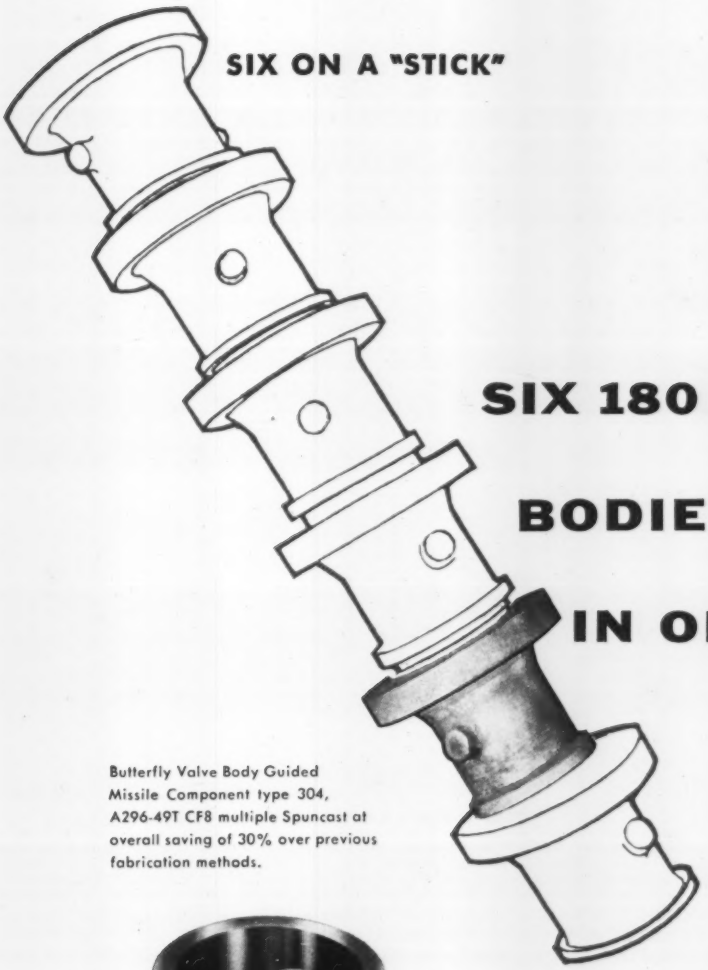
Reporter: Obviously this is an important feature of the Exide-Ironclad.

Smith: Yes it is, but it's just one of many engineering details that contribute to its high capacity and long life.

Note to battery users: Whenever you order heavy duty batteries or the equipment that requires them, be sure to specify Exide-Ironclad. For detailed bulletin, write Exide Industrial Division, The Electric Storage Battery Co., Philadelphia 2, Pa.

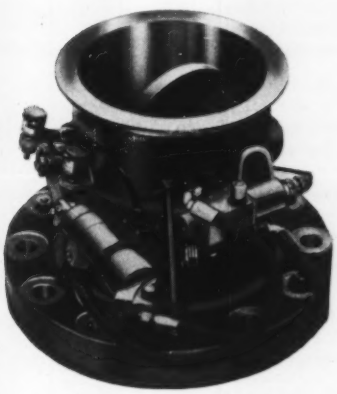
THE ELECTRIC STORAGE BATTERY COMPANY Exide®

SIX ON A "STICK"



SIX 180 LB. VALVE BODIES SPUNCAST® IN ONE PIECE

Butterfly Valve Body Guided Missile Component type 304, A296-49T CF8 multiple Spuncast at overall saving of 30% over previous fabrication methods.



Here's an opportunity to take advantage of one of the most cost saving techniques in modern casting practice—*ESCO* Spuncast Multiple Casting. You can cut fabrication and machining time to a minimum, save on material costs with definite improvement in quality.

Whether your problem is one of heat, corrosion, impact, abrasion or alloy availability, the *ESCO* engineering staff will help you plan for greater savings in time, material and money with *ESCO* SPUNCAST.

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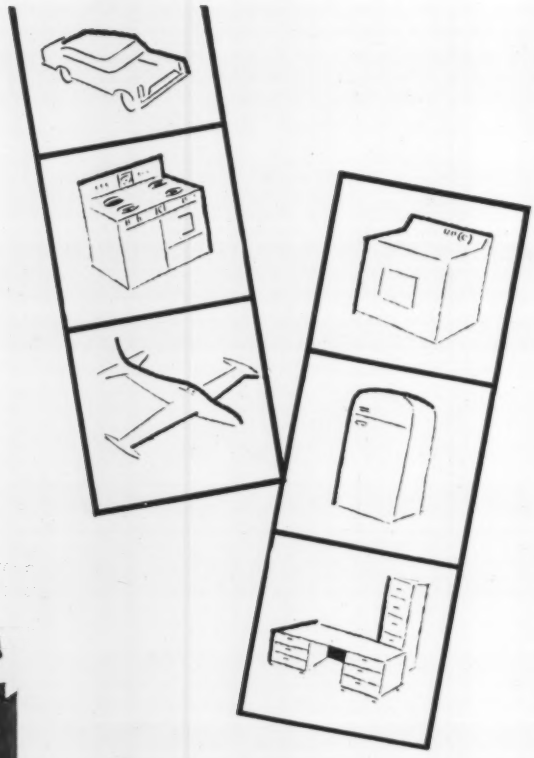
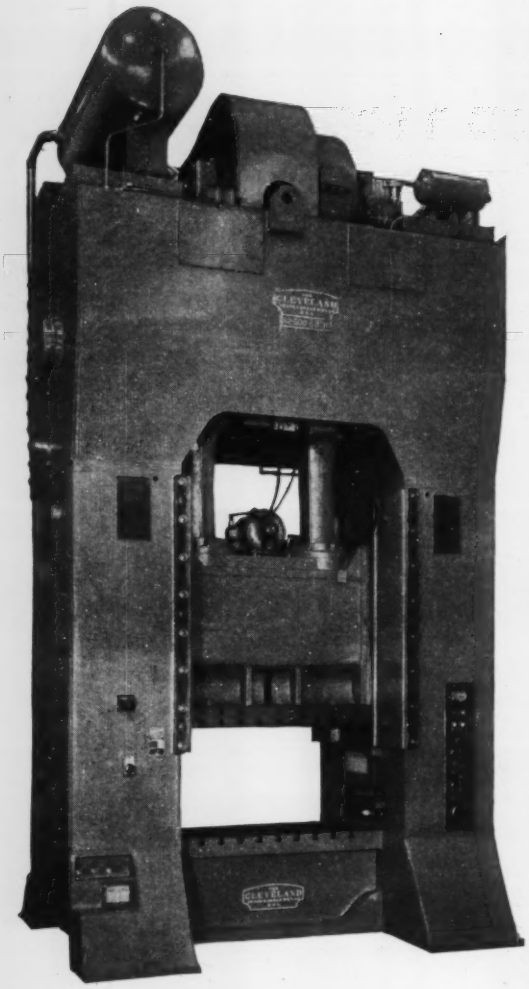




You'll get low cost Mass Production Stamping with new **Cleveland Presses**

Greater Strength • Lasting Accuracy • Fast, Accurate Slide Control

As a manufacturer of Automotive, Aviation, Appliance and Office Equipment parts, you're fully aware of the importance of dependable, economical press equipment in the production of volume stampings. We think that you, like many other leading manufacturers, will find many advantages in new Cleveland Presses.

Here's why

Modern Cleveland Single Point, Two Point and Four Point Presses are designed to give you greater strength for lasting accuracy—with reduced weight. Look at the Cleveland Two Point Press shown here. You'll find these important improvements incorporated for greater operating efficiency.

- The Dependable (patented) Cleveland Clutch is arranged with combination clutch and motor control for fast, accurate slide operation.
- Separate automation control is provided for auxiliary feeding devices.
- Slide, counterbalanced by air, is quickly, easily adjusted by push-button controlled high torque motor with magnetic brake.
- Die space is lighted from both sides for greater operator visibility . . . faster, easier die adjustment.
- Fool-proof safety blocks are chained to disconnect plugs.

There are 11 types of Cleveland Presses in a wide range of sizes. One of these is sure to be your answer for lower stamping costs. Just write or call today!

The CLEVELAND Punch & Shear Works Co.

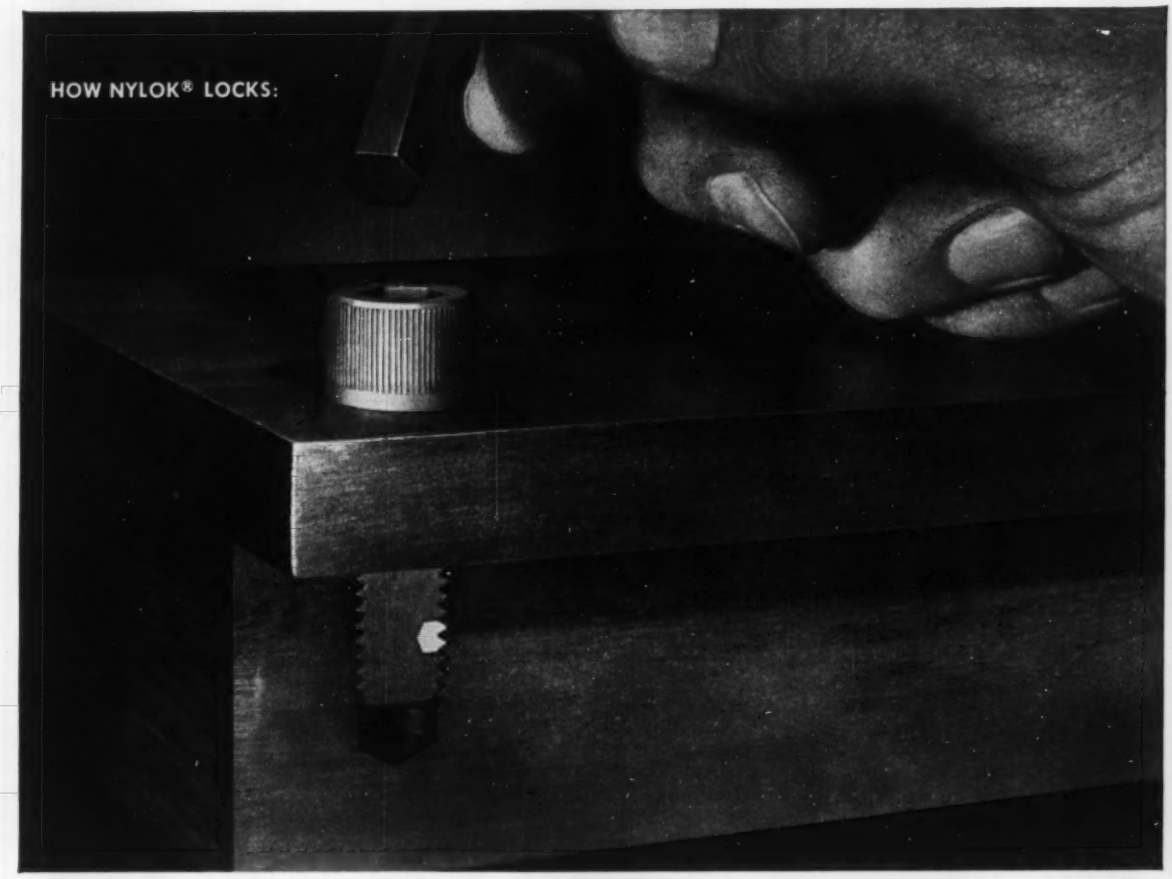
Power Presses • Fabricating Tools • Punching Tools and Dies

East 40th and St. Clair Avenue, Cleveland 14, Ohio

Offices at: New York • Chicago • Detroit • Philadelphia • East Lansing

THE CLEVELAND PUNCH & SHEAR WORKS CO.

Established 1880



LOCKED! The tough, resilient nylon pellet keys itself into the mating threads. It forces threads together and locks the screw securely.

NEW—self-locking UNBRAKO socket head cap screws

Self-locking UNBRAKO socket head cap screw.

They won't work loose. And they simplify design and save production time.

UNBRAKO socket head cap screws are now available embodying the Nylok* self-locking principle. Nylok provides the first truly practical solution to the problem of making cap screws self-locking.

An UNBRAKO cap screw with Nylok is a single self-locking unit. No auxiliary locking devices are needed. Just thread the UNBRAKO into any tapped hole. *Seated or not*, it locks positively wherever wrenching stops. The tough, resilient nylon pellet forces mating threads together and holds tight. The screw will not work loose.

You save production time when you make products with self-locking UNBRAKOS. And you get greater simplicity in design with less bulk and weight. The number of parts you must assemble to achieve full locking action is reduced to the absolute minimum. Lockwashers under screw heads are no longer necessary. Costly wiring of cross drilled heads is eliminated. And in many cases you will save weight and mass by using shorter screws in tapped holes instead of drilling through and using nuts and lockwashers.

Self-locking UNBRAKOS are reusable. They have uniform locking and installation torques—with no galling or seizing on mating threads. They successfully withstand temperatures from —70° to 250°F. And, when screws are properly seated, the locking pellet also functions as a liquid seal.

A complete line of self-locking UNBRAKO socket screw products, in a wide range of standard sizes, materials and finishes, is available through your authorized industrial distributor. Technical data and specifications are detailed in Bulletin 2193. Write us for your copy today. Unbrako Socket Screw Division, STANDARD PRESSED STEEL Co., Jenkintown 33, Pa.

T.M. Reg. U.S. Pat. Off., The Nylok Corporation

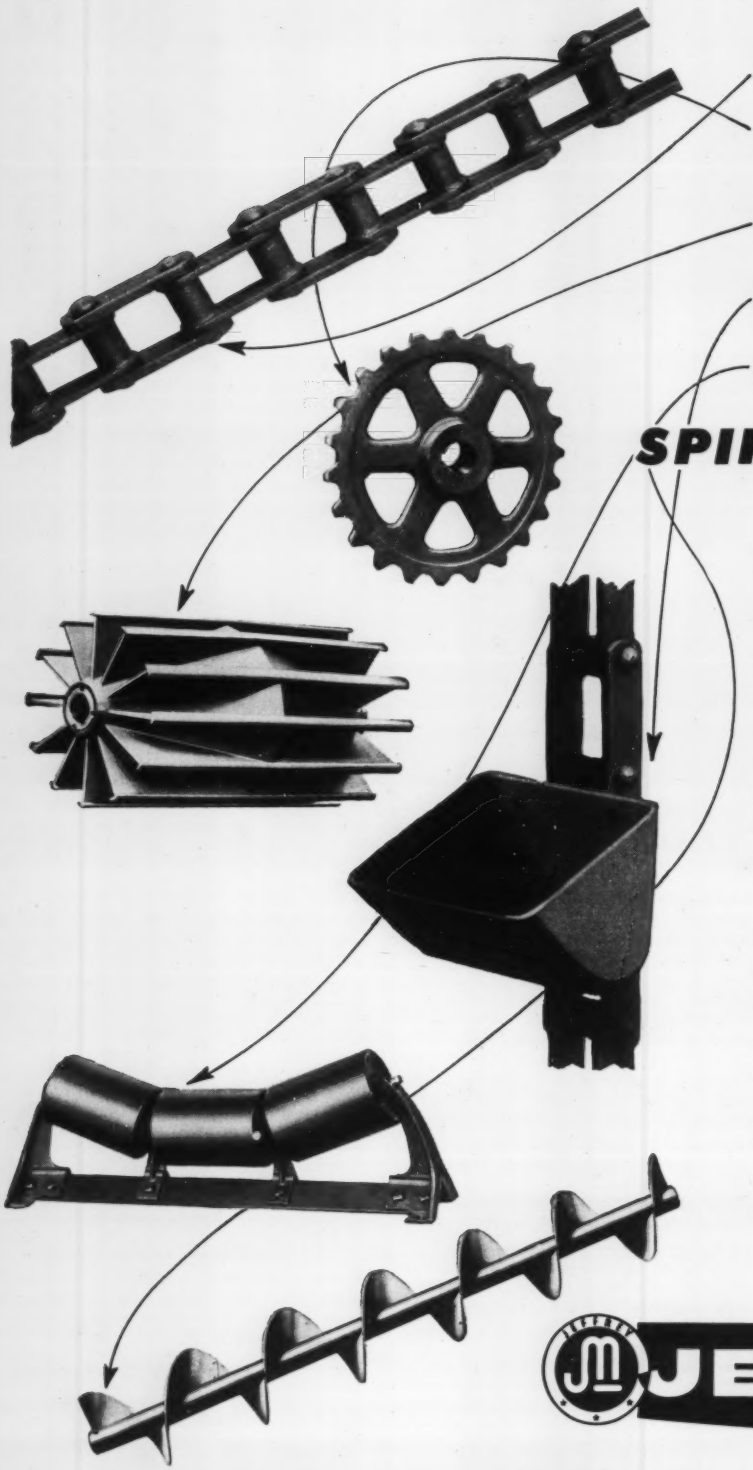
STANDARD PRESSED STEEL CO.

UNBRAKO SOCKET SCREW DIVISION

SPS

JENKINTOWN PENNSYLVANIA

Specify **JEFFREY** when you replace



CHAINS
SPROCKETS
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SPIRAL FLIGHTS

YOUR Jeffrey distributor can supply the units you need for replacing worn parts and modernizing old equipment. Your materials-handling and power-transmission machinery will give more efficient, economical operation when you use these time-tested, dependable products.

Jeffrey replacement parts have the same sound design as those used on original equipment. All are designed for maximum service. Materials and workmanship are the finest. Jeffrey District Offices and Distributors are located in all principal cities. The Jeffrey Manufacturing Co., Columbus 16, Ohio.

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CONVEYING · PROCESSING · MINING EQUIPMENT · TRANSMISSION MACHINERY · CONTRACT MANUFACTURING

The man with the diamond

The bouncing diamond-pointed weight of the Shore Scleroscope shows its skilled operator whether the hardness of this mill roll's surface meets the specifications of its purchaser. Failure to pass this test is rare at Mack-Hemp; our long experience in roll making... one hundred and thirty-four years of it . . . has made the close control of every production step second nature to us, from pattern making to final testing. It is one of the many reasons why *you get more tonnage from the rolls with the Striped Red Wabblers.*

MACKINTOSH-HEMPHILL
Division of E. W. BLISS Company
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MACKINTOSH-HEMPHILL DIVISION · PITTSBURGH, U.S.A. ·

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The Blade of Damascus

In the dazzling, romantic days of the Three Musketeers, the name, "Damascus," symbolized the finest tempered steel that could be obtained.

Today the blade of Damascus has taken on a more specific significance. It symbolizes the finest welded stainless steel tubing that can be obtained.

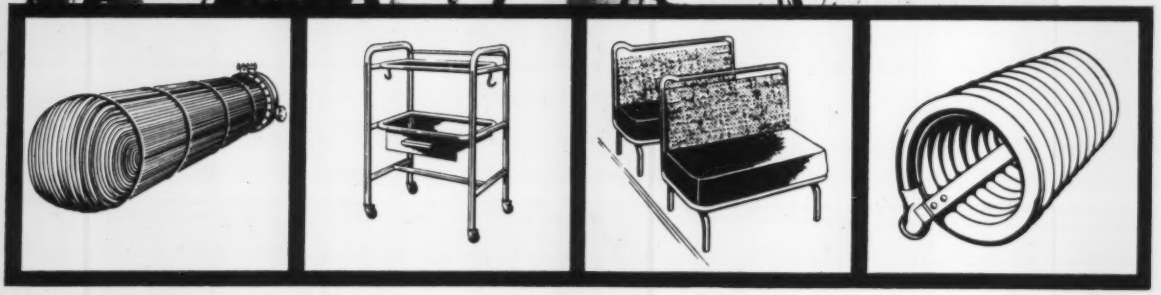
Damascus Tube Company is proud of its reputation for outstanding quality, service and delivery.

No matter what your needs are for welded stainless steel tubing, think of Damascus.

DAMASCUS TUBE COMPANY

STAINLESS STEEL TUBING AND PIPE

GREENVILLE, PENNSYLVANIA



Welding steel plate on a 300-ton open hearth ladle at the W. B. Pollock Company, Youngstown, Ohio.

We increased our fire insurance coverage 50% and cut premiums 69% with "Automatic" Sprinklers

...William B. Pollock Company

Here are the figures:

5-YEAR TOTAL PREMIUMS

Building and Contents — before Sprinklers	$40,214.00
Building and Contents — with "Automatic" Sprinklers and 50% added coverage	12,560.00
5-YEAR SAVINGS	**$ 27,654.00**
(Without sprinklers, premium with added coverage would have been $60,416.00)	
Business Interruption Insurance — without Sprinklers	$ 5,880.00
Business Interruption Insurance — with "Automatic" Sprinklers	1,520.00
5-YEAR SAVINGS	**$ 4,360.00**
TOTAL SAVINGS FOR 5-YEAR PERIOD	**$ 32,014.00**

(Cost of "Automatic" Sprinkler System $44,496.00)

"As manufacturers of heavy equipment for blast furnaces, steel mills, chemical and petroleum plants, our property is not ordinarily considered a "combustible occupancy." Yet, in our case it was highly desirable for us to protect our buildings and equipment and safeguard our continuity of production. This our "Automatic" Sprinklers will provide—plus returning the insurance savings shown.

"In addition, we have now taken out payroll insurance for our employees—to cover time lost in the event of a fire—at one-fourth the cost we would have had to pay without "Automatic" sprinklers. This also assures maintenance of our low rate for State Unemployment Compensation."

WANT MORE FACTS? Send for our Bulletin No. 66 "The ABC of Fire Protection" which tells you how "Automatic" Sprinkler Fire Protection can protect your plant—while reducing your insurance premiums and returning a profit.

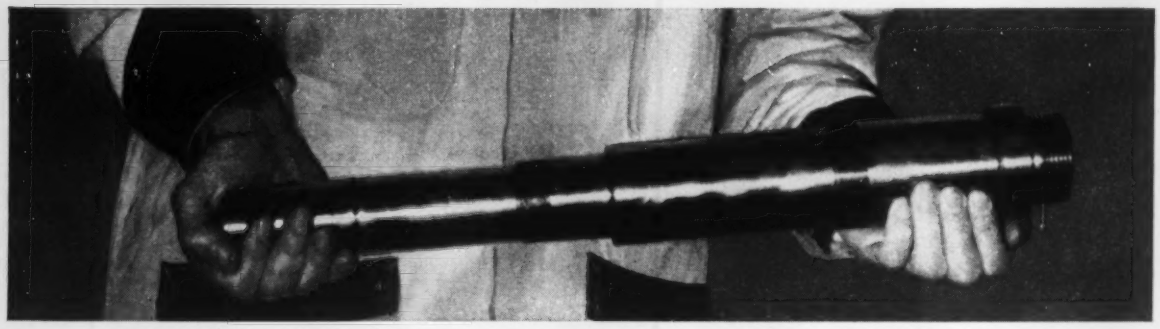
"Automatic" Sprinkler

"AUTOMATIC" SPRINKLER CORPORATION OF AMERICA

Dept. "S", YOUNGSTOWN 1, OHIO

OFFICES IN PRINCIPAL CITIES OF NORTH AND SOUTH AMERICA

Machining Costs Cut 25%
by switch to NEW RYCUT 50



Logan Engineering Co. report shows how you can save up to 30% with a Ryerson leaded alloy

THE PROBLEM—This Chicago manufacturer of precision lathes faced a tough production problem from a time and cost standpoint. Lathe spindles have to be tough and hard with high wear resistance—so the steel Logan originally used was SAE 52100.

But the spindles were turned down and center-drilled from the solid to hole sizes as large as 1⅜". And ID's had to be accurate and free from scoring along the entire length of the spindles. 52100 provided the required mechanical properties but was slow cutting and created production difficulties and a high scrap rate.

Needed: A *free-machining* steel that would develop the high hardness levels, the toughness and wear strength required for the application.

THESE LARGE ALLOY STOCKS . . . also carbon and stainless steels in every shape and size, are in stock at Ryerson. Also call Ryerson for reinforcing steel service, industrial plastics, machinery and tools, etc.

THE SOLUTION—Logan engineers had long been on the lookout for a steel that would solve their production problems so they were eager to try New Rycut 50 when this Ryerson 50-carbon alloy steel with a controlled lead addition was suggested by Ryerson metallurgists.

New Rycut 50 was a success from the start! Now, after two years, Harry Peterson, Logan plant superintendent, reports: "New Rycut 50 has saved us a consistent 25% of our former costs in the production of lathe spindles. Rycut's uniform machining and hardening properties have reduced scrapped parts to a minimum and the steel has proved satisfactory in every way."

This is just one of many case histories in our files on the steels in the Rycut series—New Rycut 50, Rycut 40 and Rycut 20. Actual performance records show machinability increased as much as 50% . . . tool life lengthened as much as 300% when a Rycut steel is used in place of a standard alloy of comparable mechanical properties.

To get further information on these great new cost-cutting steels or for quick shipment of any steel requirement, call or write your nearby Ryerson plant.

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • WALLINGFORD, CONN. • PHILADELPHIA • CHARLOTTE • CINCINNATI CLEVELAND • DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

Metalworking Outlook

Results of the Rarick Rebellion

Three major conclusions can be drawn from the results of the United Steelworker elections: 1. Although David McDonald was victorious, he has much fence mending to do, especially in the Monessen-Donora, Pa., and Lorain, O., areas which favored the challenger, Don Rarick. 2. The Rarick vote was anti-McDonald, not particularly pro-Rarick, reflecting dissatisfaction with the McDonald regime's method of managing the union, especially the boost in dues. 3. Rarick support was markedly strong among younger members. The voting was generally orderly and unusually heavy.

Status of Labor Negotiations

Of 21 contracts negotiated in the northeastern Ohio area thus far in 1957, the weighted average increase in wages is 7 cents per hour. Associated Industries of Cleveland reports that in the same period last year 16 companies had granted 9.8 cents per hour. Those results are still preliminary; odds are the weighted average wage boost will be closer to 8 cents per hour this year.

Price Protests from Gardner, Mass.

Sign of the times: Ten steel using companies in the Gardner, Mass., area have issued a formal protest to steel companies over new and revised steel price extras. They claim their steel costs are increased an average of more than $7 per ton. They are urging Massachusetts congressmen and various commerce groups to join in the complaints. Gardner claims to be the center of the "baby carriage industry," although other consumer goods are made in the area.

But Prospects Look Good

Primary market prices rose another 0.5 per cent between December and January. But many people still think it's a good time to get into business. More corporations were formed in January than in any other month in history, reports Dun & Bradstreet Inc. The 14,632 new incorporations last month were 38 per cent more numerous than in December, 9 per cent higher than in January, 1956, and about 9 per cent above the previous record in March, 1955.

GNP in '57: $430 Billion

Look for the Gross National Product to reach $430 billion this year, compared with $412.4 billion in 1956 and $390.9 billion in 1955. Only half the 1956 increase represented an expansion in the volume of goods and services produced. The remainder reflected higher prices.

Record Steel Expansion

Despite the steel industry's failure to get fast tax amortization, it will spend $1.7 billion this year on expansion, a record. Outlays in earlier years:

Technical Outlook—p. 85 Market Outlook—p. 129

Metalworking Outlook

$1.2 billion in 1956; $730 million in 1955; $680 million in 1954; $1 billion in 1953; $1.2 billion in 1952. The industry has spent $8 billion on new equipment and construction in 11 years, 1946 through 1956.

Freight Cars Rolling

Despite the shortage of steel plates, 7822 freight cars were delivered in January, the highest since October, 1953. Order backlogs stood at 114,656 on Feb. 1. At the January rate of production builders could turn out nearly 94,000 this year, compared with 64,000 produced in 1956. But odds are against output that high. Bet your money on about 85,000.

The Atom Goes to Sea

Main propulsion turbines and gears for the Navy's first nuclear powered cruiser will be made by General Electric Co.'s West Lynn, Mass., plant. The contract for more than $4 million covers propulsion turbines, steam separators, reduction gears, condensers and other turbine equipment. Bethlehem Steel Corp. is building the ship; Westinghouse Electric Corp. is furnishing the reactor components.

Washington Notes

The life of all export licenses expiring Feb. 28 has been extended to Mar. 31 because of the East Coast dock strike . . . The list of business firms having access to Atomic Energy Commission restricted data continues to grow; 41 access permits were issued in January to bring the total to 1184 . . . For the first seven months of this fiscal year, $388 million has been set aside in government contracts for 6550 small firms . . . The Commerce department has set up an Industry Exhibits Division in its Office of International Trade fairs to help U.S. industry with trade fair displays.

Straws in the Wind

More than 16 billion cans of food will be produced by American canners this year, to surpass the previous record set in 1951 by 40 million cases, predicts National Canners Association . . . Close to 10 million U.S. homes will be completely or partially air conditioned within five years, says Carrier Corp. . . . Look for major remodeling projects in 5 million American homes during 1957 . . . The electrical industry produced goods and services in 1956 valued at almost $52 billion . . . Some 6700 utility aircraft worth $103.8 million were shipped in 1956, compared with 4400 units worth $68.3 million in 1955 . . . Industrias Kaiser Argentine, producing jeeps at Cordoba, Argentina, operated at a profit in January for the first time in its two-year history . . . Some 75 per cent of British steel firms nationalized by Britain's former Labor government have been returned to private ownership . . . Ventures Ltd. of Canada and Vitro Minerals Corp. have formed the jointly owned Bolivex Corp. to explore untapped mineral wealth of Bolivia.

what's the DIFFERENCE...

the DIFFERENCE is...

To you, the user or buyer, the most important difference between MARVEL High-Speed-Edge Hack Saw Blades and ordinary blades is the *unequalled* performance you get from MARVEL Blades.

Performance reflected in higher production (faster cutting-off), greater accuracy of cut-off blanks, and longer blade life has made MARVEL the preferred blade in every kind of metal sawing operation.

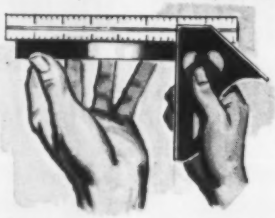
To get the *difference* in performance, always insist on MARVEL High-Speed-Edge Hack Saw Blades. Leading Industrial Distributors have them in stock.

Write for "The MARVEL Story." It has complete details on MARVEL High-Speed-Edge Hack Saw Blades and Hole Saws.

HIGHER PRODUCTION

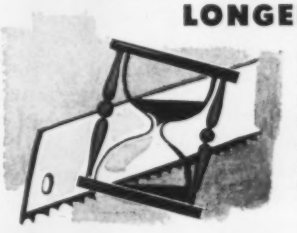
Unbreakable MARVEL High-Speed-Edge Blades can be worked faster and harder than any other blade with complete safety. They will withstand the highest speeds and heaviest feeds attainable on any make hack sawing machine. MARVEL Blades will cut any machineable metal. No wasted time changing blades for different materials.

GREATER ACCURACY



Composite construction permits MARVEL Blades to be tensioned from 200% to 300% more taut than ordinary blades. This produces greater rigidity of the high-speed-steel cutting edge, resulting in maximum obtainable accuracy of cut-off blanks.

LONGER BLADE LIFE



Each MARVEL High-Speed-Edge Hack Saw Blade is triple tempered to assure maximum toughness of the cutting edge. MARVEL Blades not only give you longer life, they assure a *more efficient* cutting life, with resulting lower blade costs.

B-1121

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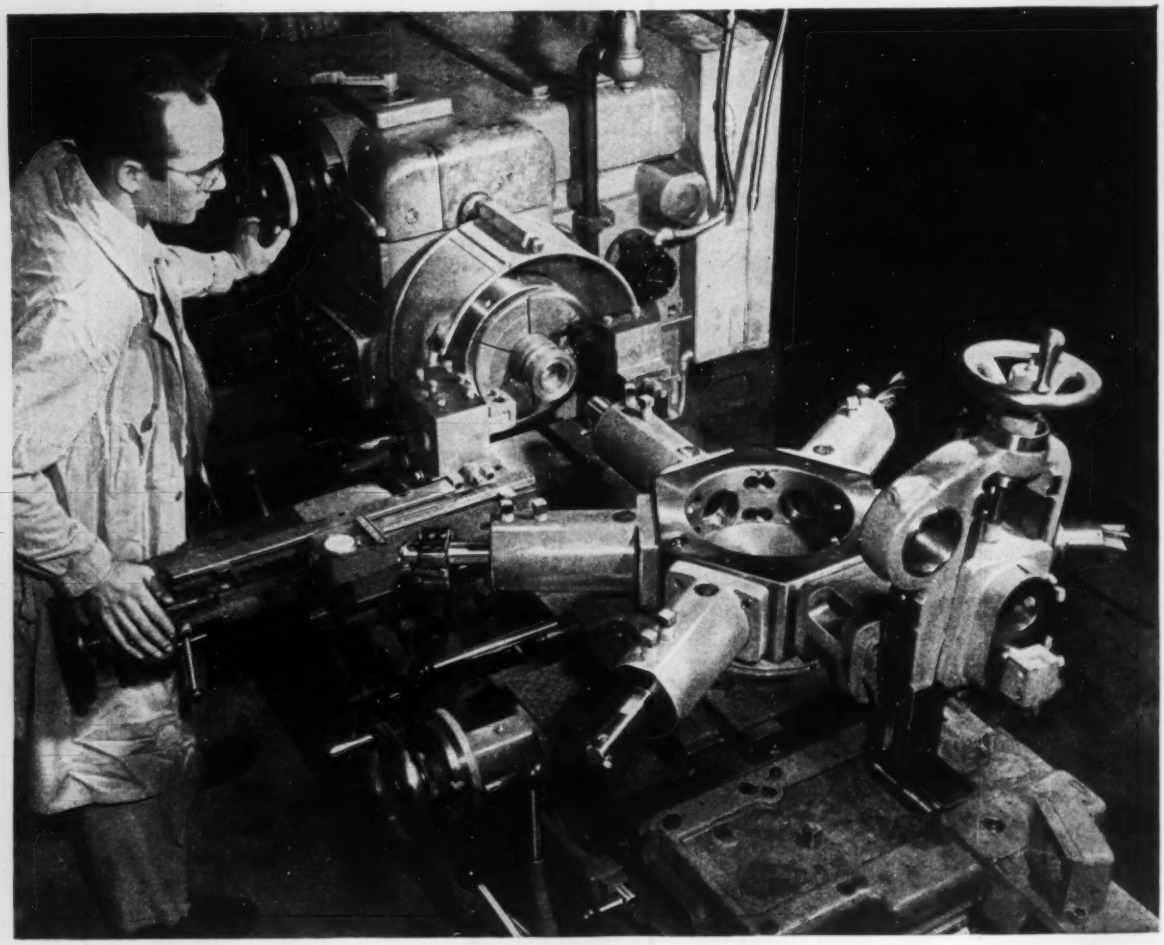
MFG. CO.
5700 WEST BLOOMINGDALE AVE. • CHICAGO 39, ILL.

MARVEL Metal Cutting SAWS
Better Machines—Better Blades



New Gisholt 30 H.P. Turret Lathe features a compact, integrated headstock, bedframe design. Nickel alloyed components help keep the 12-speed unit running smoothly . . . dependably at top performance. Produced by Gisholt Machine Co., Madison, Wisconsin.

Gisholt depends on nickel alloy steels for highly stressed parts in new saddle-type turret lathes

In Chuck Screws—carburized type 3312 nickel chromium steels with wear resistance plus a tough case to prevent thread chipping, and a strong core to carry heavy torsional loads.

In Certain Headstock Gears—type 4620 Ni-Mo case-hardened to provide wear resistance and strength with a minimum of distortion during heat-treatment.

In Drive Pinions for Hexagon Turret Saddles—where 4340 Ni-Cr-Mo steel quenched and tempered to 40-45 Rc has proved its uniformity and reliability through years of service.

Three problem parts! Three practical solutions for Gisholt! All proved . . . with nickel alloy steels. What about critical metal parts in *your* products?

Chances are, too, that solutions to the problems they present lie in the outstanding combinations of properties available from steels containing nickel. Why not take advantage of Inco's available knowledge of the capabilities of nickel steels. Send us the details of your problem, and we will be glad to suggest possible solutions.

INCO TRADE MARK **THE INTERNATIONAL NICKEL COMPANY, INC.** 67 Wall Street New York 5, N.Y.

Needed: A Tax Reform!

This year the U.S. Treasury's Internal Revenue Service will collect taxes from industry on $6 billion worth of "fictitious" income—money that actually wasn't earned because of inadequate depreciation allowances on plant and equipment.

In 1934, the Internal Revenue Service issued Bulletin F as a basis for computing depreciation. A piece of equipment with an estimated life of ten years, for instance, could be written off on a straight-line basis of 10 per cent a year. But the life of most equipment was placed at about 20 to 25 years.

Twenty years later, IRS came out with these alternatives to straight-line depreciation allowances: 1. The double declining balance method—20 per cent of the cost of a piece of equipment with a ten-year life could be written off the first year and 20 per cent of the remaining balance each of the succeeding nine years. 2. The sum-of-the-years digits method—10/55 of the cost of a machine with a ten-year life could be written off the first year, 9/55 the second year and so on.

These alternatives provide a measure of relief on acquisitions of new plant and equipment, but the unrealistic life expectancy figures of Bulletin F still harass management.

It means that industry cannot fully recapture its original capital investments until long after the plant and equipment are obsolete or worn out. Worse yet, creeping inflation makes it impossible to replace capital equipment for anything like what it cost originally. The tax system makes it difficult to accumulate the additional funds needed out of profits.

Steel is an example: Twenty-five years ago U.S. Steel built an open-hearth plant costing $10 million. It got the money back via depreciation allowances, but it will cost $64 million to replace that plant. The balance of $54 million must come out of profits after taxes. To do that, U.S. Steel must earn $112.5 million before taxes.

One solution is the application of a revaluation factor in figuring depreciation. In France, the cost of fixed assets purchased in 1914 or earlier may be multiplied by 194.4. The factor is scaled down for more recent years.

Other possibilities are: Tax-free depreciation reserves, depreciation based on replacement cost rather than original cost, and depreciation on the user's estimate of life of the equipment or its expected production.

Admittedly, there is no easy answer. But you can help by keeping your trade association and congressmen informed about your special problems.

A tax reform is needed to keep American industry young and virile and to provide the incentive for continued growth and progress.

Irwin H. Such

EDITOR-IN-CHIEF

Meet a couple of our dissatisfied employees

They work in a modern building near Chicago with a group of other discontented Inland people. Steelmaking processes aren't quite fast enough, or economical enough or practical enough to suit them. And steels themselves are too weak or too hard or too costly to meet the standards they keep on raising. They're committed to that truly American concept of the importance and inevitability of change and they believe that the continuing acquisition of knowledge is the only tool for the production of better steels at lower cost. They are Inland researchers and you are their ultimate beneficiaries.

INLAND STEEL COMPANY • 38 South Dearborn Street • Chicago 3, Illinois

Sales Offices: Chicago • Milwaukee • St. Paul • Davenport • St. Louis • Kansas City • Indianapolis • Detroit • New York

IS THERE A SLUMP?

These Indicators Don't Show It

	January, 1957	January, 1956	Change, 1957 Vs. 1956
Auto Output	642,090	612,078	up 4.9%
Truck Output	94,138	105,766	down 10.9%
Steel Ingot Production	11,001,000 tons	10,828,231 tons	up 1.6%
Nonfarm Employment	51,297,000	50,284,000	up 2.0%
Car Loadings*	3,213,271	3,393,762	down 5.3%
Power Output*	——	——	up 7.1%
Coal Production*	45,796,000 tons	50,620,000 tons	down 9.5%
Construction Put in Place	$3046 million	$2947 million	up 3.3%

*Periods ending Feb. 2, 1957, and Feb. 3, 1956.

Business Dip Not in Sight

Gains in autos, steel, electricity more than offset drops in coal and car loadings; employment up over year ago. Secretary Humphrey sees continuation of prosperity

NO GENERAL business slump is in prospect this year. Contrary to recent predictions of a recession, 1957's gains in January point to another year of high activity. One month doesn't make a year, but metalworking sales should be at least as good as they were in 1956 when they hit a peak of $135 billion.

Federal Reserve Board's industrial production index stood at 146 (1947-1949=100) in January, compared with 143 for January, 1956. Metal fabricating, a major part of the general index, was up to 180, a 10 point climb from last year's January figure of 170.

Higher—Most categories are doing better than they did in the corresponding period last year (see tables above). Two of the three that are down, trucks and coal, are partially explained by extenuating circumstances.

Truck production, down from January, 1956, is the only dark spot in an otherwise bright automotive picture. But the Ford model change-over in January accounted for most of the decrease.

Recent floods in the South hurt coal production, but it was under year-ago figures even before then. This is one of the reasons why freight car loadings are off.

Building Steady — Construction outlays last month stood at an annual rate of $44.8 billion, compared with total expenditures of $44.25 billion in 1956. If you take into account the inflation factor, January was probably even with the year-ago month in physical volume.

Housing is down, with only 62,000 units being started in January, compared with 73,700 units a year ago. The decline in starts was entirely in units begun under mortgages insured by the Federal Housing Administration or guaranteed by the Veterans Administration. Those with conventional financing increased about 5000 over last January's figures. In other areas of consumer spending, prospects are excellent (see page 71).

Steel Gains—Steel played the star role by setting an all-time January high—only the second

time the monthly production total has topped 11 million net tons. So far in February, production is running 40,000 to 50,000 tons ahead of 1956 weeks.

At the beginning of this year, metalworking management predicted the industry dollar volume in '57 would rise 7.7 per cent to a total of $145 billion. They also thought the second half would be better than the first.

George Humphrey, secretary of the treasury, told Congress recently he sees no signs that prosperity will recede in the next 18 months. "If there is not some restraint," he said, "of course we will be heading into difficulty, but as of the moment, I see no reason why we should change our estimate for the next 18 months based on the present progress of the country."

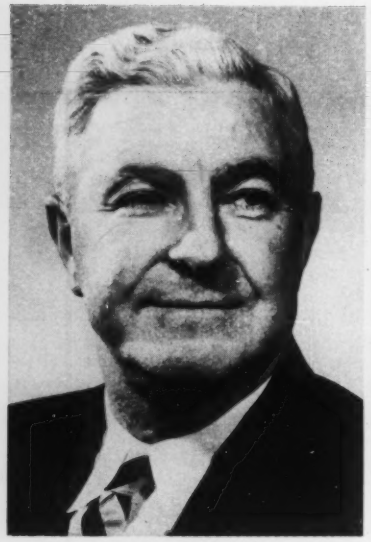
Warehouse Improvements Cited

The most significant advances in warehouse activity along the West Coast have been in administration and marketing. So reported Charles Ducommun, president of Ducommun Metals & Supply Co., at a press conference in Los Angeles sponsored by the American Steel Warehouse Association.

Mr. Ducommun said intensified marketing programs were made essential because warehouse gross profits have fallen off while costs doubled.

Los Angeles' airframe industry is the largest warehouse goods user.

Steelmen See Record Tonnage in 1957



T. F. PATTON
President, Republic Steel Corp.

"We have been looking forward to a year in which steel output might reach a new record, perhaps as high as 120 million ingot tons. Support of this comes from continued high levels of construction activity, and the automobile industry which is expected to improve on its 1956 performance, and a high rate of production of equipment for the nation's industrial plant.

"Another factor which we believe improves the prospects for 1957 is the new three-year steel labor contract agreed upon last August."

A. C. ADAMS
President, Jones & Laughlin Steel Corp.

"My own prediction of steel production for 1957 has been and is 120 million tons, or an average operating rate of 90 per cent of capacity.

"At the present time, our unshipped orders here at J&L are at an unprecedently lofty level, higher than on Jan. 1, 1957, or Jan. 1, 1956. Therefore, we are optimistic despite a few pessimistic forecasts that have been made.

"From everything we are seeing, the facts do not justify the gloom which has emanated from Washington, or, in some cases, from New York."

R. L. GRAY
President, Armco Steel Corp.

"Our year-end forecast was that the steel industry would make and sell more steel in 1957 than ever before in its history. This would mean production in excess of 117 million tons.

"At this time we see no reason to change our forecast, although we realize that in recent weeks the metalworking industry has become inventory-concious and current orders for steel are somewhat less than comsumption. We still believe the steel industry will produce a record, or near-record tonnage in 1957, provided the buying public does not become frightened."

Platers' Prospects Brighten

They have high hopes of getting more nickel in '57. If they do, most job shop operators will do better this year than last. Washington listens more closely to their problems

WITH chances of getting more nickel better, job shop electroplaters are bullish in their outlook for the year.

Prompting optimism is word from H. B. McCoy, administrator, Business & Defense Services Administration, of plans for an Electroplating Industry Advisory Committee to "provide the most effective means for permitting the Commerce department to obtain advice and counsel" on nickel problems of platers (see page 60).

"This marks the first time that this industry has been asked to take part in top level industry-government planning," says P. Peter Kovatis, executive secretary, National Association of Metal Finishers.

Struggle — "Ostensibly, one of the tasks of the committee will be to assist in setting up plans and procedures for the equitable distribution and allocation of nickel and other metals," he adds.

For the last two years, NAMF has waged an uphill fight in Washington to obtain more nickel. Platers contend their allocations have been "unfair and unrealistic."

The Senate Committee on Small Business last year concluded that the electroplating industry "has not been receiving an equitable share of the available supply of nondefense nickel," and added that distribution systems for the electroplating industry "are obsolete and self-defeating in that they do not give proper consideration to changing conditions."

More from Cuba — Increasing support for electroplaters' nickel pleas has been coming from BDSA, and the Office of Defense Mobilization is taking a new look at the problem. One move may be to make more of the Nicaro, Cuba, production available to a wider cross section of metalworking.

Platers don't know how much relief they may get, or how soon. Some look for help in 90 days. But when, and if, it does come it will be welcome because 50 per cent of the 2500 job platers are reportedly dependent on nickel. To date, few shops have gone out of business due to shortage, but many have found it touch and go and have turned to the gray market, even the black market, for supplies.

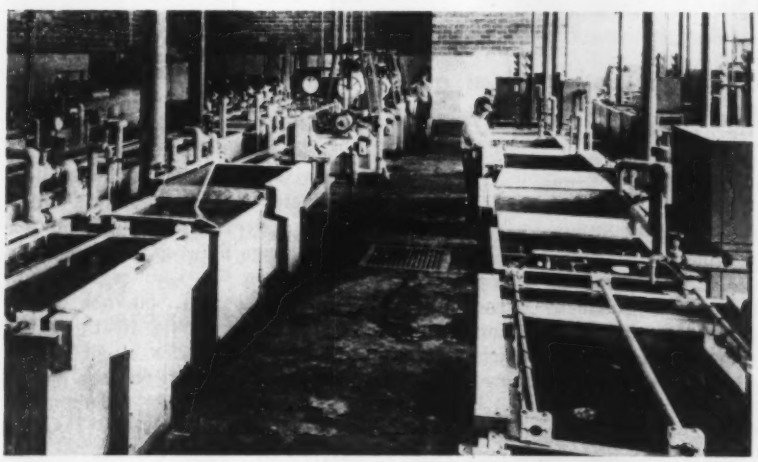
Nickel Saving — At least one good thing: The shortage has brought improved "housekeeping" in the industry. Job shop operators are keeping a sharper eye on thicknesses. Many shops have "nickel-saving" programs with awards to workers who co-operate.

One plater said: "Although no figures are available, I would guess that if additional nickel does come through, our industry will experience a much better year in 1957 than it did in 1956, which was fairly good. If nickel does not come through I predict a slump in the plating business this year."

No Substitute—Another leading plater believes that nickel supply will continue to be the industry's greatest problem unless there is relief. No satisfactory substitute has been found, he adds, although the consumption of white brass and bronze increased last year. Use of bright, high speed copper and anodized aluminum has also increased, but nothing takes the place of nickel in many applications.

This year is expected to bring on an increased need for anodizing equipment and for full automation of large-scale operations, with emphasis on automatic load-unload systems, plant monorails and automatic selective processing equipment for a variety of finishes from a single machine.

Greater use of automatic buffing, germanium rectification and aluminum anodizing equipment is is also anticipated, but job platers are hanging their hopes on more nickel.



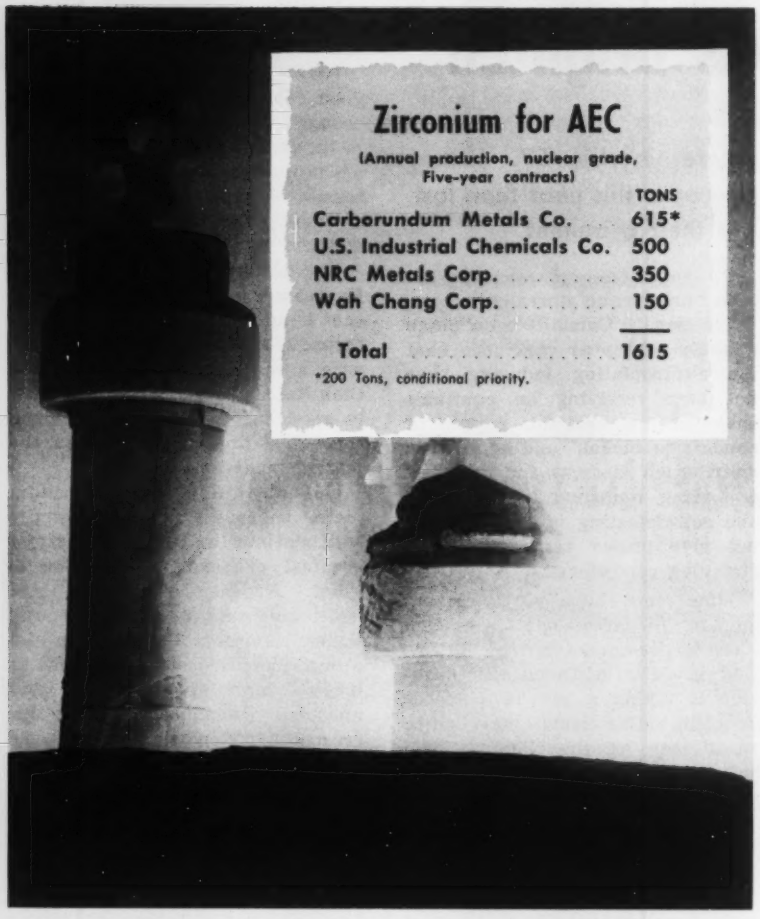
Hanson-Van Winkle-Munning Co.

This type of equipment helps make prospects bright for platers in 1957

Drop Forgers See Demand Up

Demand for drop forgings this year can be better than it was in 1956, but competition will be tougher, and producers will direct special attention to merchandising operations. These views were expressed at the Drop Forging Association's winter meetings in Chicago Feb. 11-13.

Giving concern is the possibility that larger users of forgings may produce more of their own, that output of automobiles in 1957 may fall short of early estimates and that the cost of doing business will continue to rise.



Carborundum's 3300° F arc furnace used in production of zirconium

Zirconium Arrives

Industry expanding to meet demand for both nuclear and commercial grades. Costs still fluctuate, with no early indication of stabilizing

ZIRCONIUM production for commercial use is spiraling. In less than a decade it may rival other "new" metals, including titanium.

The commercial outlook for the metal and its alloys is especially bright in the chemical and marine industries. Manufacturers want zirconium for valves, tubing, heat exchanger equipment, mixing agitators, clad reactor tanks, pump impellers, spray nozzles, thermowells and grid wire in electronic equipment.

Grades—There are two types of zirconium: Nuclear grade and commercial grade. Hafnium is removed from the nuclear grade (for atomic reactors) by a costly separation process—up to $3 a pound. The commercial or industrial grade contains hafnium and is for civilian use. It goes through reduction, but not separation, and is cheaper.

Until now, commercial exploitation has been held up by technical stopgaps and the high cost of producing ductile metal. Many zirconium compounds are used in chemical and metallurgical industries, but the metal is still unknown to most potential users even though it is ninth in abundance—ahead of copper, nickel, zinc and lead.

Hole Card — Zirconium's ace in the hole for rapid expansion is in nuclear energy applications, including atomic reactor cores. The Atomic Energy Commission has contracted with four companies for delivery of 1615 tons annually for the next five years.

The four producers are completing new plant facilities with separation and reduction capacity well in excess of the yearly contract commitments for the nuclear grade. This additional capacity is in anticipation of heavier commercial and industrial demand for other than pure nuclear grades.

Midyear Upswing—Deliveries of nuclear grades will rise sharply around midyear as new plants start to produce. Certificates of necessity for accelerated tax amortization, totaling $16,281,210, have already been issued to stimulate the construction and equipping of these plants.

With completion of a new plant in Parkersburg, W. Va., Carborundum Co.'s subsidiary, Carborundum Metals Co. Inc., Niagara Falls, N. Y., will increase capacity to over 750 tons a year. This is a 587 tons hike over the firm's past 163-ton capacity. Carborundum has a contract to supply the AEC with 415 tons of nuclear grade yearly. The company also has a conditional contract for an additional 200 tons.

U.S. Industrial Chemicals Co., a division of National Distillers Products Corp., starts production about midyear on a 1000 ton per year sponge plant at Ashtabula, O. It will use the sodium reduction process to supply 500 tons of nuclear reactor grade to the AEC annually. U.S.I. has an option on a new Australian process which may lower costs of hafnium removal.

By July, U.S.I. expects to produce 41.5 tons of nuclear grade material for the AEC each month.

In addition, the company has a year-end goal of 40 tons per month for commercial use. U.S.I. will not sell zirconium sponge, but will produce platelets — small metal pieces for ingots.

NRC Metals Corp., a subsidiary of National Research Corp., Cambridge, Mass., has a $22,750,000 contract with the AEC to furnish 350 tons of nuclear grade annually for the next five years. The firm's new Milton, Fla., plant will be in operation by August.

NRC Metals will produce 750 tons of hafnium-contained zirconium yearly. Initial production of nuclear grade will hit 350 tons annually. The outlook for industrial uses is so promising that Robert A. Stauffer, vice president for research, thinks demand for commercial grades will soon top government purchases.

Wah Chang Corp., New York, has contracted for 150 tons of nuclear grade annually to be produced at the reactivated Bureau of Mines plant, Albany, Oreg., by the magnesium process. The government has granted Wah Chang a certificate of necessity for $1,492,000 to expand facilities at Albany.

Cost Scale—Although the price of sponge, reactor and commercial grades has declined sharply since private industry took over production, costs still vary, as do estimates of where prices will stabilize. One manufacturer's price of $12.27 per pound compares with some government contracts for just $4.53 a pound. U.S.I. estimates commercial quantities will be available soon at $4.75 to $6.50 a pound for both platelets and sponge. NRC Metals foresees nuclear grade nearer $6.50 and hafnium-contained commercial sponge around $3.50. Wah Chang Corp. will charge $9 for nuclear grade.

Cost History of Zirconium

1957: Carborundum Metals Co. selling reactor-grade sponge on open market for $9.50 per pound.

1953-56: Carborundum Metals produced and sold over 1 million lb of reactor-grade zirconium (sponge) for between $12 and $15 per pound.

1948: 2236 lb of zirconium sold for between $135 and $235 per pound.

1945: 21 lb of iodide zirconium sold at $315 per pound.

1943: 0.08 lb of iodide zirconium sold at $630 per pound.

Peddles Sunshine

Florida pushes its climate to attract industry; postwar trickle becomes stream

FLORIDA, which traditionally has used its climate to lure vacationers, is casting the same bait to attract industry.

"Skilled manpower wants to, and will come to Florida," proclaims an advertisement of the Florida Development Commission. Facts bear out the claim. The trickle of industry which started going into the state after World War II has broadened into a small stream.

Employment in the metalworking industry alone more than doubled from 1947 (12,900) to the first half of 1956 (28,190). Outlook: Add several score new plants to the present 600. They will employ an additional 12,000.

What Is Offered — 1. Warm weather. 2. Sunshine. 3. Low taxes. 4. Vacation spots. 5. Easy access to South American markets. 6. Increasing consumer market.

Floridians prefer (and are attracting) light metalworking industries — electronics, aluminum fabrication, aircraft, precision instruments and bearings.

An engineering firm with offices in Louisville and Orlando, Fla., reported two nibbles to an advertisement for engineers to live in Louisville. The same advertisement for Orlando-based engineers brought 400 responses.

Minerals — Some ilmenite and rutile, from which titanium is recovered, are found in Florida, as are zirconium and large deposits of limestone. Big scale prospecting is being pushed all over the state.

The small stream bears watching. Florida, 27th among the states in population in 1930, was 16th in 1955. Trends project it into tenth place by 1965.

U. S. Atom Insurance

Should the government supplement the insurance private companies issue to protect the public and industry against atomic hazards?

A plea for federal support is made in a report by the Legislative Drafting Research Fund of Columbia University for the Atomic Industrial Forum Inc., New York.

The report states that the possibility of a catastrophic accident, however remote, is a serious deterrent to the development of atomic energy, especially for power purposes.

It recommends: The Atomic Energy Commission should require proof of financial responsibility as a condition of licensing atomic installations. The government should provide an indemnity program to cover any losses in excess of the amount of protection required.

A. O. Smith Plans Additions

Three plant expansions of A. O. Smith Corp., Milwaukee, will increase its facilities in that city almost 120,000 sq ft. The $600,000 construction program will start in March and be completed late in the year.

Caterpillar Builds Engine Plant

A 500,000 sq-ft plant will be built by Caterpillar Tractor Co., Peoria, Ill., on an 1100-acre site 12 miles north of Peoria.

It will convert basic industrial engines for use as industrial and torque converter power units, marine power plants and electric sets. The V-type engines will have up to 650 hp.

Site preparation for the plant will start in a few months. A research center and general office building will also be built.

Operations will begin during 1958. About 3500 will be employed when all facilities are complete. The engine plant will employ about 1200.

Coal Pipeline Is Ready

Pitt Consol's $12.5-million conveyor will move slurry 108 miles from mine to Ohio generating plant. It will deliver 1.3 million tons a year

COAL BY the gallon will start flowing into Cleveland Electric Illuminating Co.'s Eastlake, O., generating plant on Apr. 9—date of the formal opening of Pittsburgh Consolidation Coal Co.'s 108-mile coal pipeline, said to be the longest conveyor of its kind in the world.

Test runs of the slurry (half water, half coal dust) have been made, but the pipeline will not go on stream until officials of the two companies and three interested railroads gather at the huge generating plant 20 miles east of Cleveland on Lake Erie.

Rate—Each day the pipeline will pour 3500 tons of coal, mixed with 840,000 gallons of water, into the settling tanks at Eastlake. The rate is 150 tons an hour.

Filtering and drying will reclaim 99 per cent of the coal and reduce the remaining 1 per cent before the water is turned into Lake Erie. The pipeline and drying plant were built by Pitt Consol for $12.5 million. It starts at Georgetown, O., the site of the coal company's strip mine.

Underground—The 10-in. carbon steel pipe is buried 4 ft to prevent freezing. Three pumping stations are along the 108-mile route, each equipped with three 450-hp motors. The pipe, electricwelded in 40-ft lengths, is treated with an asphaltive compound, wrapped in glass cloth, then treated with more compound. Its average thickness is ¾-in. An anticorrosive chemical is added to the slurry.

Three railroads, the Pennsylvania, New York Central and Nickel Plate, each have options to buy a 15 per cent interest in the venture, which is expected to clip the cost of shipping by rail in half. The railroads gave rights of way in return for the options.

"Transportation costs amount to approximately 45 per cent of what we pay for each ton of coal," said CEI President Elmer Lindseth. "Any practical way we can get it to our plants cheaper is well worth the effort."

Big Share—The pipeline is expected to deliver 1.3 million tons of coal a year, 80 per cent of the total used by the generating plant. Pipeline statisticians figure it would take more than 20,000 railroad hopper cars to carry the same amount.

Drying and dewatering are done in three stages. Slurry enters settling tanks, is vacuum filtered, then blown into drying columns heated to 1200°F. The dried coal contains about 5 per cent water and is ready to be blown into the plant's furnaces.

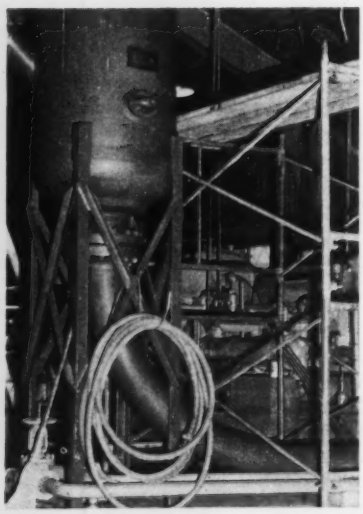
Texas Builds More Pipe Lines

A $241-million expansion program has been started by Texas Eastern Transmission Corp., Shreveport, La.

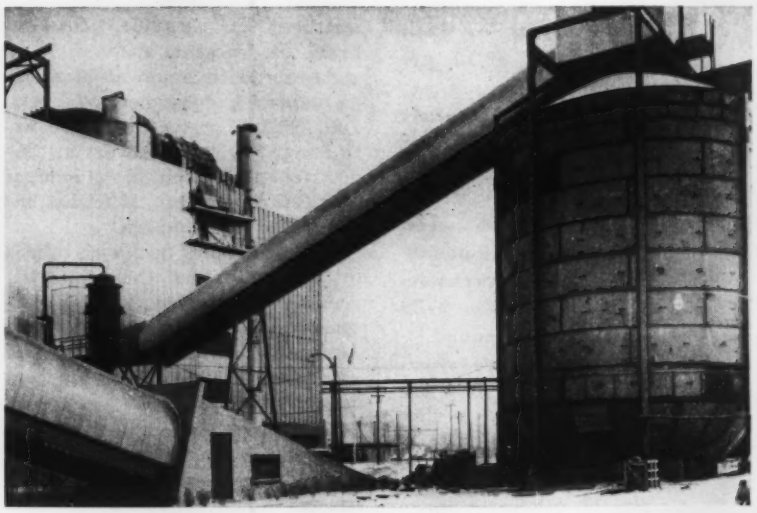
Already completed are substitute pipeline facilities from Beaumont, Tex., to Kosciusko, Miss. Cost: $64 million.

Another $36 million will be spent for conversion of natural gas facilities to oil products, including the construction of a lateral line through Indianapolis to Chicago.

This phase of the program is subject to approval by the Federal Power Commission.



Slurry goes in here (at Georgetown, O.) . . .



. . . and comes out here (dehydrated for storage at Eastlake, O.)

Committee of Stainless Steel Producers, AISI

Bottom half of warehouse is brick, top is 302 stainless curtain wall

Warehouse Expands

A. M. Castle Co.'s new $4.5-million steel warehouse near Chicago uses supermarket techniques: Orderly stacks, fast check out systems and automatic doors

RAPID expansion—from sales of $18.7 million in 1950 to $36.2 million last year—forced A. M. Castle Co.'s move from Chicago to roomier facilities in suburban Franklin Park, Ill.

Robert Heggie, vice president, says: "Our new warehouse has nearly 10 acres under one roof. The location permits faster delivery to most of our customers, and we're centrally located to most of the expanding industrial sites in the Chicago area. Planned construction of two expressways close by also was a factor in our location here."

Floor Plan—The warehouse has five bays which are exactly 700 ft long—four are 100 ft wide, and one is 110 ft wide. Incoming mill shipments of steel are handled by two railroad sidings at the north end of the building and by a two-lane truck drive through the center. At the south end is the loading and shipping drive, wide enough for three highway trucks.

Each bay is a storage area for a particular line of products and is equipped with two center-cab Whiting cranes, each with two hoists. Products are stacked in adjustable racks for maximum accessibility. For special accuracy steels, such as ground polished items, felt-lined racks are provided.

Auxiliary equipment is centrally located to each product line. For example, in the bar and rod areas are six saws, from the hand type to completely automatic machines. In the structural bay is a 60-in. diameter friction saw. Flame cutters (including an Airco eight-torch electric eye tracer) are used for plate cutting.

Controls — New facilities have automatic humidity and temperature controls. When truck or rail entrance doors open, huge air blowers aimed at the openings go on automatically to keep temperature changes to a minimum.

Orders—About 90 per cent of the orders are phoned in. Conveyors will be installed to speed orders past the various processing desks. Final orders go from the order office into the warehouse by pneumatic tube to one of three stations for completion.

Order processing time has been cut 10 to 15 per cent, say company officials. "And we can load trucks in one-third to one-fourth of the time it took at our previous facilities."

Before and after loading, the trucks can be weighed on a Fairbanks-Morse automatic printing scale.

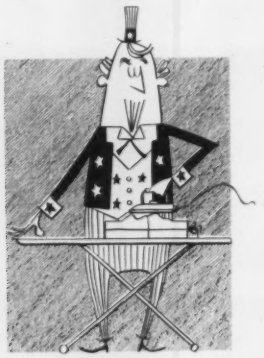
Whirlpool Division Grows

More than $2 million will be spent this year by Whirlpool-Seeger Corp. on its Clyde Division, Clyde, O. A parts storage building will be constructed and an addition will be made to the administration building.

Record for Johns-Manville

Johns-Manville Corp., New York, will spend $35-million this year for expansion, says A. R. Fisher, president. This record program involves $9 million more than the company spent last year.

Uncle Sam Irons Out Nickel Distribution



COMMERCE department reports "substantial progress" in smoothing out problems of distributing nickel to job platers (see page 55). Commerce assumes the over-all shortage of the metal will continue, but says platers will get better treatment because of: 1. More uniform record keeping by plating supply houses. 2. A new base period centered on 1955 or 1955-56. 3. Distribution of premium priced nickel on the same basis as market priced nickel. 4. A buyers' option to take anodes or salts. 5. More consistent treatment of new customers or customers with new facilities. 6. Small users' getting their full quota of market priced nickel on a quarterly rather than a monthly basis (allowing carry-overs of unused monthly quotas).

New Goals for Liquid Oxygen, Nitrogen

Growing use of guided missiles is responsible for a new expansion goal for liquid oxygen and nitrogen producing facilities. The Office of Defense Mobilization says eligibility for fast tax write-offs will depend on the additional capacity "contributing materially to current missile programs." Suitable location and adequate transportation to guided missile projects will be among tests used to judge proposals. Wanted: 4 billion cu ft more.

Congress Keeps Talking Budget Cuts

Congress has its pruning shears out for the President's $71.8-billion budget. There's talk of cutting it by about 5 per cent ($3.6 billion). But wise Washington heads have more traditional ideas about Congresses and budgets. Consensus: "Congresses don't cut budgets; they raise 'em." Don't expect a budget of less than $70 billion.

Committee Finds Labor Racket Evidence

Expect the special Senate committee set up to investigate labor-management racketeering to be in business for some time. Investigators are at work in nine cities; they already report "widespread" abuses. Some of the cities being checked: New York, San Francisco, Seattle and Portland, Ore. Unions involved so far: Teamsters, carpenters, operating engineers, plumbers and steamfitters, allied industrial workers and other building trades groups. Charges being probed: Labor-management collusion, racketeer control of unions, misuse of funds, violence, shakedowns.

Imports Hurt U.S. Makers

Imports of plumbers' tubing and other brass mill products are pinching U.S. mills, industry representatives tell the Business & Defense Services Administration. They say such imports are about 80 per cent of domestic consumption; that the foreign price is about 30 per cent lower than the domestic. Foreign brass and copper rods and sheet copper are underselling U.S. products by about 15 per cent. Action to limit imports was suggested, but chances for quick action appear remote.

Washington Whispers

- Beginning with the second quarter, set-asides of copper and copper-base alloys will be figured, says BDSA, on average monthly shipments in 1955.
- Atomic Energy Commission is making more boron-10 available to industry. The isotope absorbs neutrons without becoming radioactive itself, and is used to shield reactors, control mechanisms and in measurement instruments.

Meet Howard C. Holmes: He's director of the Aluminum & Magnesium Division, Business & Defense Services Administration. Mr. Holmes is on leave for six months from duties as assistant general sales manager, Kaiser Aluminum & Chemical Sales Inc., Chicago.

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This 8-page bulletin lists and describes all the current publications on the principal families of A-L Products: stainless and heat-resisting steels, tool and die steels, electrical steels and alloys, permanent magnet materials, and Carmet carbides. There is a handy order form for your convenience in getting the material you need: technical and fabricating data, information on applications and fields of utility, etc. *Write for your copy.*

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WHATEVER your stainless steel requirements may be, you can satisfy them with A-L Stainless.

It's produced in any grade, form or finish you want—from the finest wire to heavy plates, castings and forgings, including sheets, strip, bars, shapes, tubes —*everything!*

That's not only handy, but advantageous: one reliable source, one undivided responsibility, one well-known standard of quality and uniformity.

Complete technical and fabricating data —engineering help, too—are yours for the asking. Just keep it in mind to specify "A-L Stainless Steel" when you're in the market. And remember, wherever you use it, this time-tested stainless steel looks better, lasts longer, usually works out to cost you very much less in the long run. ***Allegheny Ludlum Steel Corporation, Oliver Building, Pittsburgh 22, Pa.***

For Stainless Steel in ALL Forms—call

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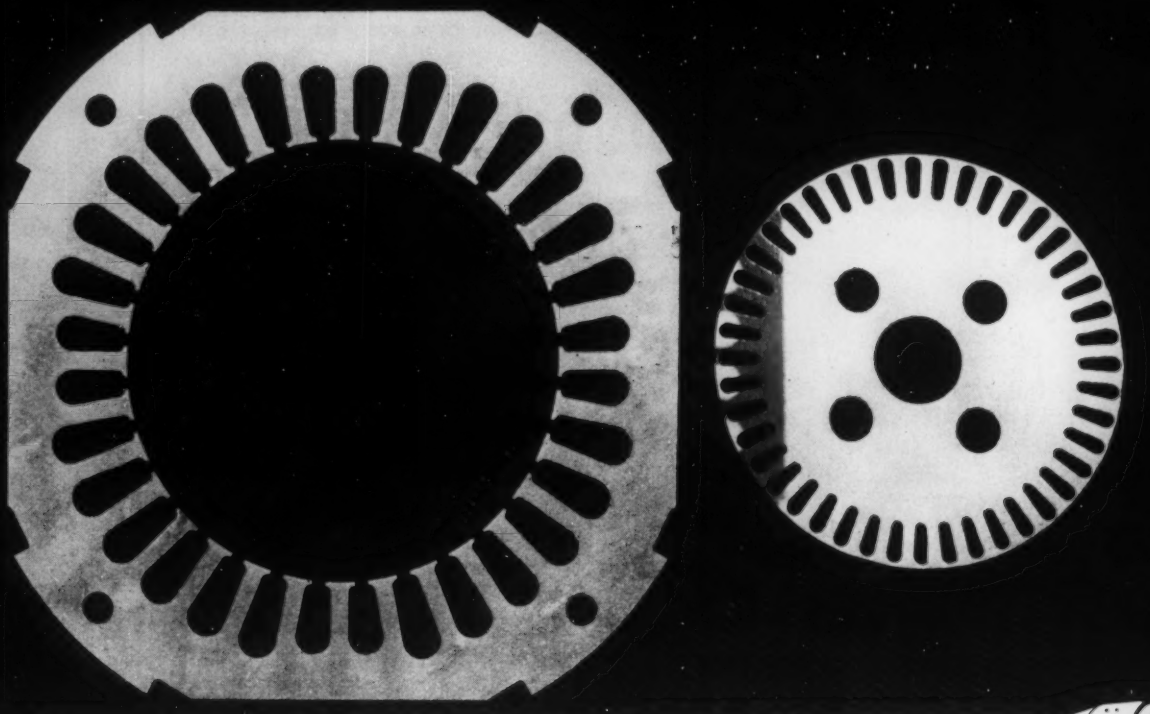


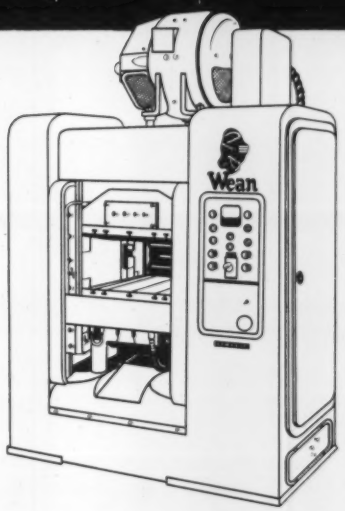
What shape is your production in?

Production Rate:

Conventional Press — 180 two-piece units per minute.
Wean "Flying Press" — 300 two-piece units per minute.

Both of these electric motor parts, measuring 3½" and 5½" in diameter respectively, were produced in a single set-up on a conventional press at the rate of 180 per minute. Using the same dies, the "Flying Press" produced these parts at the rate of 300 per minute. This is typical of the type of production rates that result when the job is done on a "Flying Press."

Although engineered for the ultra-high speeds, the "Flying Press" offers other major cost-saving advantages too. For instance, since it has no brake or clutch to wear out, maintenance savings alone are an important consideration. But you'll want the complete story so . . . write today for your copy of the "Flying Press" brochure. It will open your eyes to new production horizons.



Wean Equipment Corporation
CLEVELAND 17, OHIO

20-3757-3

Tips on College Recruiting

Competition mounts for engineering and business administration graduates. Suggestion: Look closer at liberal arts people; avoid "clerk's work" in initial assignments

RECRUITING personnel on college campuses this year will be tougher than in 1956.

That outlook was forecast by Dr. Harlan Hatcher, president of the University of Michigan, at the American Management Association's Chicago personnel conference. Warned Dr. Hatcher: "The number of companies interviewing prospective graduates is running 10 per cent ahead of last year for liberal arts students and 40 per cent ahead for engineering students."

Salaries Up—That demand is pushing starting salaries even higher than last year's $360 per month for arts degrees, $398 in business administration and $426 in engineering, physics, chemistry and mathematics.

Profile—Here's a portrait of today's typical graduate. Use it as a guide in your recruiting approach to him:

1. He's less interested in a company's position than in what a company can offer in opportunity to use what he considers to be his ability and training. He expects to enter a training program, but is impatient to get through it. Studies show that 60 per cent of all graduates change jobs in their first five years, primarily because the company assigned them to "clerk's work."

2. He is success-centered to a high degree, but his idea of success is not the Horatio Alger dream. He's not anxious to become president or vice president. He's willing to settle for middle management because the price of the ultimate in ulcers, high taxes, responsibility and sacrifice in free time is too great.

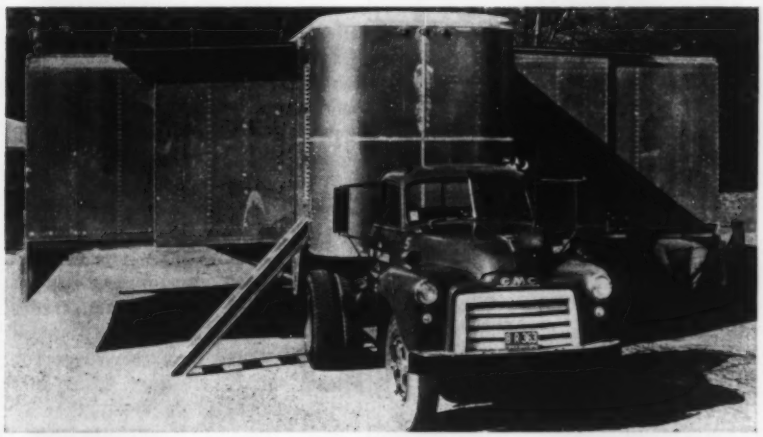
3. He is increasingly aware of the predominance of the corporation and the increasing impersonality of business organization. Many are shying away from the larger companies and settling for the smaller firms with greater potential in recognition of individual contribution and achievement.

Aid—Dr. Hatcher offers three suggestions for more effective recruiting:

1. Assign graduates to areas for which they were trained.

2. Take a closer look at the liberal arts student. There will be nearly 1200 B.A. students among Michigan's graduates this year.

3. Make sure your recruiters are career experts who can really counsel students and present job offers effectively.



Trailer Expands to Small Home Size

Pressing a button transforms an ordinary-looking truck-trailer into a room with 780 sq ft. In 5 minutes sides telescope outward, while accordian-folded aluminum floors drop into place. Gerstenslager Co., Wooster, O., with the aid of Aluminum Co. of America, Pittsburgh, built the 28,000-lb trailer. It contains more than 12 tons of aluminum extrusions, sheet, plate and castings

Foremen on Team

NICB survey shows number of companies get ideas on labor contracts from them

IMPORTANCE of foremen on the management team is gaining recognition.

The National Industrial Conference Board reports 96.4 per cent of 213 companies surveyed ask foremen for suggestions when a new union contract is up for negotiation. Only 28.6 per cent allow them to sit in on negotiations—and in most of these cases, they merely observe and advise.

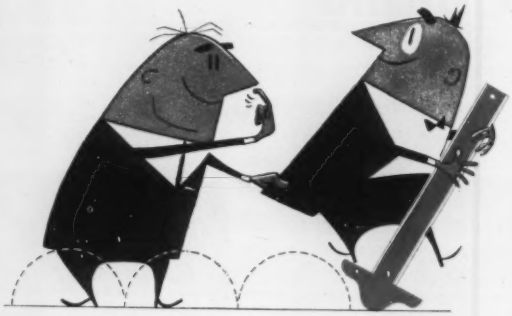
The companies which allow participation on the bargaining team (7 per cent) report:

Advantages — 1. Foremen gain status. 2. They communicate with each other better. 3. They gain better understanding of bargaining process. 4. Their executive development is aided. 5. Distorted statements by unions are less likely.

Disadvantages—1. Unions often object to foremen having knowledge of negotiations. 2. Unions may charge that foremen sometimes leak information to rank and file that the union does not want known, or before union negotiators want it known. Union reaction may make bargaining harder.

Some companies seek suggestions from foremen through questionnaires. Others call a meeting of foremen before contract negotiations. Some have trained opinion research specialists contact their foremen. Others furnish them with copies of the contract and ask that they keep notes of any difficulties throughout the life of the agreement.

All companies using any method of foremen participation in contract negotiations agree that many benefits result from getting opinions and advice from them.



Detroit Cuts Engineers' Job Hopping by:

- Tuition refunds for extra college courses.
- In-plant meetings for all divisional staff engineers.
- Time off for technical and society meetings.
- Generous patent rights for inventions.
- Seminars from visiting experts.
- Reasonable use of company cars.
- Separate office areas—even for junior engineers.
- Frequent salary reviews.

Auto Makers Woo Engineers

Their attention to details bolsters professional pride and keeps turnover rates down. Raids staged by rival firms are becoming less frequent

CAR BUILDERS have come up with ways to reduce losses of trained engineers through job hopping. Their annual turnover rate is less than 3 per cent on an industry-wide basis.

Bait — It's not always the lure of a bigger pay check that causes an engineer to seek greener pastures. Motor management has found that while money can't be neglected, prestige is beginning to play a bigger role in keeping engineers happy.

Financial security, professional prestige, interesting work and responsibility add up to job satisfaction for most engineers, say personnel people.

New Crop — The importance of holding present staffs is accentuated by the yearly need for more engineers. Auto makers seek another 2150 this year. That's about 460 more than they wanted in in 1956. This doesn't include men with degrees in physics, chemistry or other fields.

General Motors Corp. is out to net the biggest crop (1350). Ford Motor Co. wants about 450, some 210 more than last year. Chrysler Corp.'s engineering staff has its sights set on 270.

The rest will be spread among Chrysler divisions and the Little Two (American Motors Corp. and Studebaker-Packard Corp.). Almost all will be fresh out of college.

Pot's Sweeter — Companies will be paying more money to get their men. Stanley Doll, director of placement for Ford's salaried personnel, says: "We're going to try to hold close to the national average ($433) for beginning engineers."

Add the normal cost-of-living increase, and starting salaries move into the $450 range. David Waggoner, GM's central personnel staffer in charge of salaried personnel placement, suspects it will be even higher by June.

At one university (Purdue), average starting pay for graduates already is at the $500 mark.

Treasure Hunt—With these salary figures (plus higher recruiting costs) in mind, the industry is seeking methods to keep engineers content. Here's what they're doing:

Two broad approaches are used. One is a vast series of educational and training programs. The other covers a multitude of intangible benefits, ranging from separate offices to the use of more technicians to relieve engineers of routine details.

Such programs apparently are bearing fruit—witness lower turnover rate. Another encouraging factor is that wholesale raiding among rival firms has pretty much died out in the last year or two, although occasional probing attacks for top men (and their staffs) continue.

Training—Formal or on-the-job training for neophyte engineers run between one and two years at all firms. They have these common aims:

- Practical job know how.
- Giving the beginner a chance to learn the broad company structure.
- Providing for different phases of engineering work to determine where the man best fits.

Besides such programs, each company has a host of specialized courses. Some are open to any graduate engineer. On higher levels, men are carefully screened and selected.

Fringe Benefits—Intangibles include little items which make the difference between job satisfaction and job hopping (see list.)

To give you an idea of how far companies are going in this direction, GM has a director of engineering personnel relationships—Edward L. Yates of the central personnel staff.

Says Mr. Yates: "One of the things every employee looks for is somebody to talk to and tell him how he's doing." Frequent appraisals, plus a genuine open door policy, help fill this need at all companies (See STEEL, Dec. 21, 1956, p. 41).

Management — John Robertson, industrial relations manager of Chrysler's engineering staff, points out that engineers need a closer identification with management to preserve prestige.

"When a man moves up to the project engineer level at Chrysler, he's invited to several management meetings," says Mr. Robertson. Top brass acquaint him with corporate problems, give him a feeling of being more than a slide rule expert.

This attitude filters down through the ranks to men in his project group. It makes for company enthusiasm and professional pride.

Breakdown — Lyle Walsh, manager of GM's engineering staff activities, pins down another important aspect of keeping engineers happy: "We try to place men in development groups which are small as possible. That way they can be given specific assignments and responsibility more quickly."

But even these added highlights don't provide a pat answer to two troubles car builders face: 1. How much drafting board work must the young engineer expect? 2. Where do technicians fit into the picture?

Drafting—"There's no clear cut answer to how much board work the beginner must do," says Ford's Mr. Doll. Companies generally feel it can't be overdone. Most car divisions have unofficial rules requiring at least a year of board work.

Perhaps the best answer for impatient engineers who complain about unnecessary detail work comes from Mr. Yates: "If we thought this was all you could do, we wouldn't have bothered to hire you."

Technicians — Some detail work can be taken off engineers' hands by technicians, but Mr. Yates (and others) feel the shortage of technically trained assistants is almost as serious as the engineering shortage.

Ford, GM and Chrysler are training some technicians. The industry also is trying to get colleges and universities to start two-year programs for them.

Georgia Tech, Penn State and Cornell University have such courses. Several other schools are studying the problem.

Although car builders would like to see more technicians take over routine work, few divisions have come as far as Cadillac's engineering staff which claims two technicians for each engineer.

Future Threat — Auto makers emphatically agree that they have seen no major hints toward unionism among engineers. They're equally sure the UAW's drive to collect white-collar workers will set off fireworks—and soon.

Feeling is that the engineer's professional prestige can be built up enough to stave off union offers. But Chrysler's Mr. Robertson touches on one philosophical note that carries hidden impact: "Many of our engineers come from union homes. I don't believe engineers have fear of unions they did 20 years ago."

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.*

Allison Division Grows

An increased turbopropeller program has brought a $1-million-plus building expansion program to General Motors Corp.'s Allison Division in Dayton, O.

A 29,000 sq-ft addition will be made to the plant.

Salesmen Needed

National Sales Executives Inc. finds industry wants 404,580—preferably men under 45

AMERICAN industry, urgently in need of 404,580 salesmen to create new markets for expanding production, has closed the door on a good source of experience by refusing to hire men over 45, believes National Sales Executives Inc. It bases its case on a nationwide manpower survey it made.

Describing sales manpower as basic to all other problems facing industry today, the reports adds:

"The problem is complicated and made more difficult by almost a generation when noncompetitive selling was sufficient 'to get by.' Now, selling, a profession that has always attracted a small percentage of the work force, must expand in a highly competitive manpower market."

38 Per Cent—Although 38 per cent of the labor force is over 45, and this proportion is growing yearly, 72 per cent of the 26,500 NSE members queried replied they would not hire salesmen over 45.

The report showed that 255,000 experienced salesmen and 149,000 trainees are needed. The 45-year-old limit exists in all phases of selling, despite the tremendous effort to expand present sales forces.

Doesn't Fit—The report terms the situation "incongruous." It warns that business and industry are wasting manpower in refusing to consider older, experienced men.

"In many instances," it states, "older men can bring to a new employer much of the knowledge and experience companies spend years to impart to younger men."

The survey found that salaries for new personnel start as high as $550 per month. The average is $1500 for the top third of all sales forces. Only 4.9 per cent of the firms surveyed had company-paid retirement plans, but the majority offered fully paid life insurance policies.

Over half the industrial companies queried (62.2 per cent) required sales applicants to be college graduates, while 31 per cent required a high school education.

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Potential Probes of Auto Industry

- **Parts distribution**
- **Marketing methods**
- **Alleged frauds in financing**
- **Mergers**

GM's Curtice (left) and the Senate's O'Mahoney will be major antagonists as . . .

Trust Busters Eye Detroit

GOVERNMENT probes of the auto industry, particularly of General Motors Corp., will start shortly.

The Senate subcommittees on automotive marketing practices and monopoly will again try to collect evidence to bring more legislative pressure against what Sen. Joseph C. O'Mahoney (Dem., Wyo.) calls "creeping economic concentration."

Prospects—Don't look for specific legislation to come out of the investigations. It rarely does, judging from the aftermaths of previous probes. But the publicity resulting from such congressional activity frequently leads to changes by the industry itself. For example, the auto companies have modified contracts with their dealers largely because of the hullabaloo arising from last year's round of congressional studies.

Because of its size, GM finds itself drawing the hottest fire and accused of:

- Coercing dealers and spare parts distributors.
- Controlling 80 per cent of the country's bus manufacturing and 75 per cent of diesel locomotive engine building.
- Usurping 50 per cent of the automotive sales market (present sales trends notwithstanding).
- Consciously or unconsciously setting price patterns for the industry.
- Squeezing supplier companies out of business.

Exonerated—Recently, the Federal Trade Commission cleared GM of charges it has misused the term "genuine Chevrolet parts" in advertising.

Under present laws, there isn't enough evidence to indict GM for control of the bus or diesel engine building business, although lawmakers will keep looking.

New Probes — Under the chairmanship of Sen. Mike Monroney (Dem., Okla.), the subcommittee on marketing practices will dig deeper into marketing methods. It likely will hear testimony concerning the shrinking market for American Motors Corp. and Studebaker-Packard Corp. It also will listen to talk that everyone in the industry waits for GM to set car prices before announcing their own.

Particular emphasis will be given to allegations that insurance subsidiaries of auto financing companies are overcharging on premiums and attempting to palm off insurance packages which contain items of little value. In this instance, it looks like GM will be off the hook since its financing company (GMAC) doesn't handle package deals.

Suppliers — The antitrust and monopoly subcommittee and the Small Business Administration are expected to hear more reports that GM, Ford Motor Co. and Chrysler Corp. are squeezing supplier firms out of business by bringing more work into their own plants. One example is typical of the complaints partmakers are voicing.

Report — In a letter to stockholders, John Beatty, president, United Specialties Co., Chicago, reported: "Business conditions in the automotive parts industry have been extremely difficult for the last two years. Prices have been

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Mercedes-Benz Adds Sports Car

The Stuttgart, Germany, auto maker will introduce this 300SL sports car next summer. It will be a two-seater with a 6-cylinder, gasoline fuel injection engine, generate 250 hp and have a maximum speed in excess of 150 miles per hour. The roadster stands only 33 in. high at the door cowling

forced to a break-even level; sales have slowed down.

"The big companies are giving every indication of making many of the products they have been buying. Little or no credit is given us for our engineering ingenuity. In view of these factors, Chicago (plant) has decided to go out of the automotive parts business."

United made oil bath air cleaners in its Chicago facility. It now has diversified into nonautomotive business. At least six sizable companies took similar steps in 1956. Many smaller firms were forced out of business.

Other Side—Auto makers reply that they can't honestly buy a part when they can make it cheaper. In addition, they claim that no matter how much they make, they still will have to buy between 50 and 60 per cent of all supplies from outside sources.

This argument doesn't satisfy the small businessman who's facing liquidation. The SBA hopes to make supplier problems a major 1957 target.

Forecast—The future shapes up like this: GM will continue to grow. It's not apt to voluntarily divorce itself of any divisions (Chevy has been suggested).

Revisions in monopoly laws will be a long time coming.

Trust busters will continue to nag until public opinion pushes the companies into making changes. Ford and Chrysler will take their cue from what happens to GM.

GM Plans Foundry

GM will build a foundry which will make aluminum castings for its Chevrolet division near Massena, N. Y.

It will be adjacent to a proposed aluminum reduction plant to be built by Reynolds Metals Co., Louisville.

The joint program follows a similar setup between GM and Reynolds at Jones Mills, Ark. Ford and Reynolds have adjacent plants at Listerhill, Ala.

Hot metal transfer is the reason behind these joint ventures. Molten aluminum is carried in electrolytic cells or pots from the reduction plant directly to the foundry where it can be poured immediately.

The Massena foundry is in addition to GM's previously announced plans to spend $1.25 billion on 1957 tooling and facilities. The plant will cover 213,000 sq ft and will employ several hundred. Estimated completion date is June, 1959.

The Reynolds plant will be finished about the same time at a cost of $88 million. It will boost the company's primary aluminum capacity by 100,000 tons, says David P. Reynolds, sales vice president.

The Massena project is near the St. Lawrence Seaway.

Exhaust Notes

- Ford has announced an experimental gas turbine engine for its Tiltcab trucks.
- Chevrolet has announced an experimental gas turbine engine for its tandem axle trucks.
- Chrysler says it's doubling laboratory space devoted to gas turbine and piston engine research and is increasing its research staff 20 per cent.
- Legislation aiming at design and other auto safety standards is likely this year as Rep. Kenneth Roberts (Dem., Ala.), continues his investigation into automobile and highway safety practices.
- Rumors that Curtiss-Wright Corp. may have Studebaker-Packard manufacture a small car of foreign design seem unlikely. Tooling costs are too high for the company to meet for some time.
- Chrysler Corp.'s retail deliveries in January were 5 per cent higher than those of a year ago (9907 units). Imperials were 200 per cent ahead of January, 1956, figures. Some 2769 were delivered last month.

U.S. Auto Output

Passenger Only

	1957	1956
January	642,090	612,078
February		555,596
March		575,260
April		547,617
May		471,617
June		430,373
July		448,876
August		402,575
September		190,726
October		389,061
November		581,803
December		597,226
Total		5,801,808

Week Ended	1957	1956
Jan. 19	145,761	144,729
Jan. 26	145,191	135,586
Feb. 2	140,411	140,582
Feb. 9	147,163	136,308
Feb. 16	148,584†	128,324
Feb. 23	148,000*	125,502

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.

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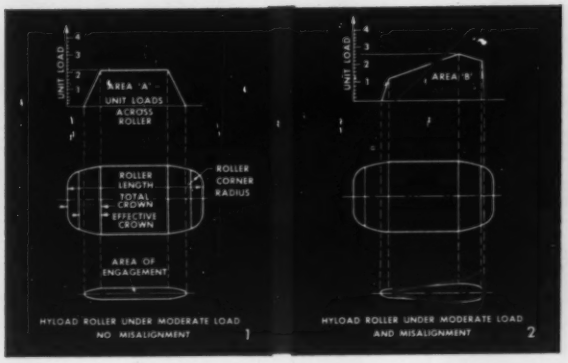
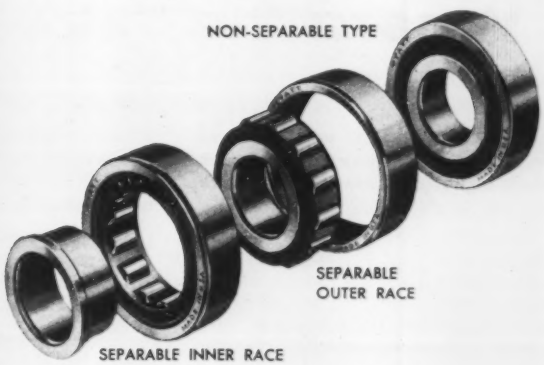
You will find full selection and application data in HYATT Catalog 150, or call your nearest HYATT Sales Engineer. Hyatt Bearings Division, General Motors Corporation, Harrison, N.J., Pittsburgh, Detroit, Chicago and Oakland, Cal.



ROLLER CROWNING MINIMIZES EFFECTS OF BEARING MISALIGNMENT

The unit load on any roller is distributed axially in a uniform manner except at the ends where crowning has been provided. Figure 1 shows how the unit load drops off to zero at the ends of the area of contact. The summation of unit loads represented by area "A" is the total roller load. This same load under conditions of misalignment (Figure 2) must result in an area "B" equal to area "A"; but the maximum unit load is considerably greater and the misaligned bearing will therefore have a shorter life. However, if the same total load is applied to an uncrowned roller in a misaligned bearing, as shown in red, a much higher unit load (area "C") results, which would still further reduce the life of the bearing. This demonstrates graphically why HYATT Hy-Load Series Bearings with roller crowning will run smoother and longer under conditions of misalignment.



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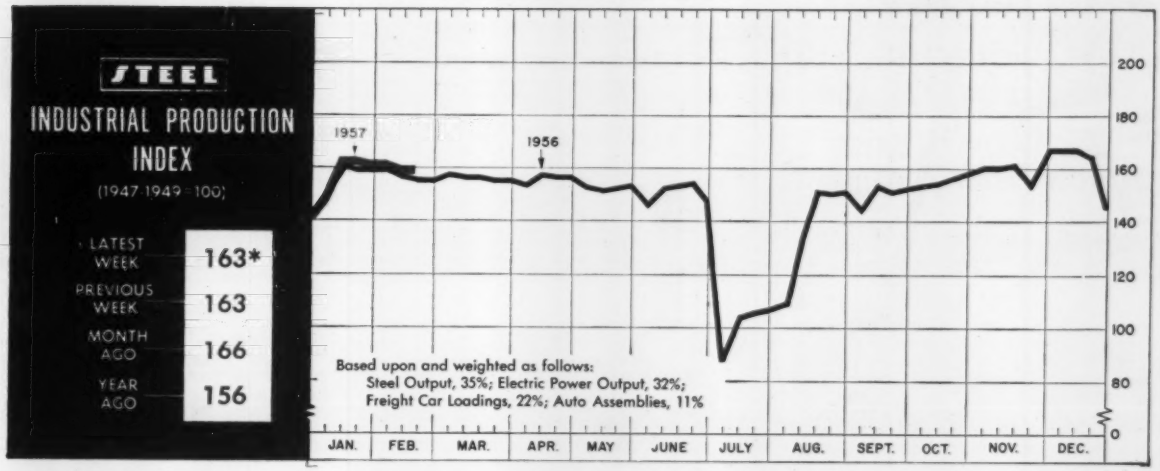

*Week ended Feb. 16.

Consumer Spending To Set Records in '57

THE STAGE is set for the biggest consumer spending binge this nation has ever seen. Curtain time is not certain, but chances are the show will get under way by midyear and give the economy a big boost in the second half, making 1957 another year of records.

The facts: Population is growing at a rapid rate. It passed 170 million earlier this month. Employment is at record levels—almost 63 million at last count. While this is well below the seasonal peak of last August, it is still the highest for January. (January and February are the two poorest employment months of the year.) By midyear, close to 67 million persons will be employed. Wages are continuing their upward trend. During 1956, personal income amounted to $325.2 billion, 6 per cent higher than it was in 1955. In December, net spendable earnings and buying power of factory workers set all-time records. And for the first time, millions of workers know when and how much their next raise is going to be, in additon to cost of living wage adjustments.

More Facts—Savings have been increasing steadily since the last quarter of 1955. The rate of increase in consumer credit has been slowing down, indicating that repayments have been at a rapid rate. Both factors are getting consumers in a better financial position to continue spending.

This spending could take several directions. It's already beginning to show up in retail store sales. The Bureau of the Census reports that total sales of retail stores in January were $14.9 billion. Adjusted for seasonal factors, this was about equal to December's sales and 5 per cent above the January, 1955, figure. Durable goods, including autos, showed the greatest increases.

Comeback—Sales of automobiles will be especially important because, except for food, consumers spend more each month for cars than for any other retail item. So far in 1957, there is no reason to

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,475[1]	2,501	2,433
Electric Power Distributed (million kw-hr)	12,000[1]	12,019	11,321
Bituminous Coal Output (1000 tons)	9,720[1]	8,775	10,150
Petroleum Production (daily avg—1000 bbl)	7,450[1]	7,461	7,116
Construction Volume (*ENR*—millions)	$311.6	$428.5	$268.3
Auto, Truck Output, U. S., Canada (*Ward's*)	181,416[1]	179,776	158,899
TRADE			
Freight Car Loadings (1000 cars)	660[1]	665	698
Business Failures (Dun & Bradstreet)	287	320	236
Currency in Circulation (millions)[3]	$30,641	$30,595	$30,247
Dept. Store Sales (changes from year ago)[3]	+5%	+4%	+5%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$18,575	$22,642	$17,748
Federal Gross Debt (billions)	$275.9	$276.0	$279.7
Bond Volume, NYSE (millions)	$23.7	$20.3	$18.9
Stocks Sales, NYSE (thousands of shares)	11,942	10,438	10,597
Loans and Investments (billions)[4]	$85.1	$85.3	$84.1
U. S. Govt. Obligations Held (billions)[4]	$25.9	$26.1	$28.5
PRICES			
STEEL's Finished Steel Price Index[5]	225.92	225.92	209.10
STEEL's Nonferrous Metal Price Index[6]	240.6	246.9	272.6
All Commodities[7]	117.0	117.1	112.1
Commodities Other Than Farm & Foods[7]	125.4	125.3	120.2

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1957, 2,559,490; 1956, 2,461,893. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100.

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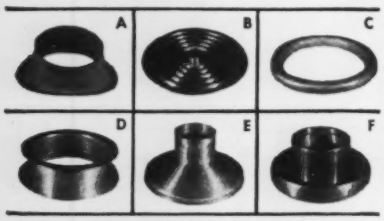
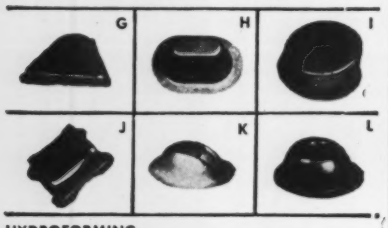


METAL SPINNING AND SPINFORMING:
Typical items: **A—Aircraft detail; B—Decorative cover; C—Retainer ring; D—Winding reel; E—Electronic shield; F—Electrical detail.**



HYDROFORMING:
Typical items: **G—Aircraft detail; H—Spindle cover; I—Aircraft detail; J—Auto bracket; K—Light reflector; L—Air cleaner.**

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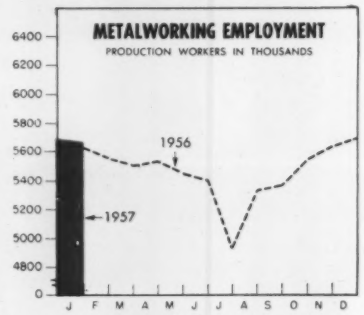
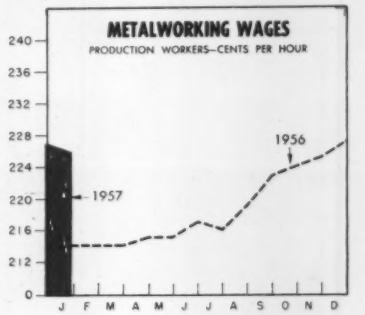


1956	Prim. Mtls.	Fab. Prod.	Mach- inery	Elec. Mchy.	Trans. Equip.
Jan.	1,141	913	1,261	854	1,449
Feb.	1,138	899	1,274	849	1,392
Mar.	1,130	893	1,281	842	1,354
Apr.	1,136	895	1,292	874	1,332
May	1,117	881	1,281	872	1,295
June	1,118	870	1,278	866	1,269
July	743	825	1,254	854	1,250
Aug.	1,091	864	1,257	878	1,235
Sept.	1,126	885	1,262	891	1,205
Oct.	1,132	911	1,264	914	1,319
Nov.	1,132	911	1,273	918	1,402
Dec.*	1,137	911	1,286	904	1,449
1957					
Jan.*	1,137	901	1,290	891	1,447

*Preliminary.
U.S. Bureau of Labor Statistics.



1956	Prim. Mtls.	Fab. Prod.	Mach- inery	Elec. Mchy.	Trans. Equip.
Jan.	233	203	217	193	225
Feb.	232	202	217	193	224
Mar.	232	203	217	194	225
Apr.	233	204	218	196	226
May	233	204	218	196	226
June	234	206	219	197	228
July	227	206	220	198	229
Aug.	236	207	221	199	232
Sept.	241	211	225	201	236
Oct.	242	213	225	203	238
Nov.	244	213	225	204	239
Dec.*	245	215	226	205	243
1957					
Jan.*	247	214	226	206	239

*Preliminary.
U.S. Bureau of Labor Statistics.

Charts copyright, 1957, STEEL.

cry on this account. January was the best month auto dealers have had since last June, and February is starting out the same way. While inventories are building up, several producers still report new orders well ahead of deliveries. One important factor to remember is that many cars bought in the tremendous sales effort two years ago are coming out from under the installment plan this year. Those owners become prime prospects. This should start showing up in late spring.

Appliance makers also are keeping a sharp eye on retail sales. A tip-off may have come from Admiral Corp. last week when J. R. Oberly, vice president of the appliance division, stated that factory shipments of refrigerators and freezers last month were the highest for any January in the company's history. W. R. Seibert, treasurer of Sylvania Electric Products Inc., expects sales of his corporation will increase 10 per cent this year over last. Sylvania is an important producer of radios, television sets, component parts and other electric and electronic products.

How Many Houses—Home builders are hoping that some of the savings will be put into more housing starts. January didn't do so well in this respect (see page 53), but all the decline was in FHA and VA insured homes. Housing experts declare that if there is an easing of credit and some revision of VA interest rates by midyear, 1957 could end up ahead of 1956.

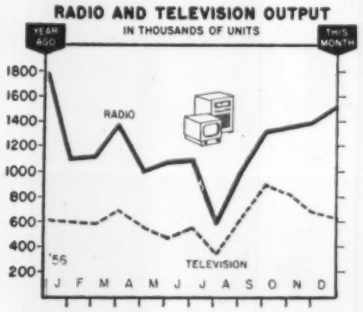
There may be a lot of "ifs" in consumer spending in 1957, but economist A. W. Zelomek, writing for the *Bulletin of the National Association of Purchasing Agents*, says: "We expect the gain in gross national product of about $8 billion, annual rate, between the first and second quarters of 1957 to be due (largely) to an increase of $5.6 billion in total consumer spending."

Charts Electronics Growth

Sylvania's Mr. Seibert says that in the next ten years, dollar value of TV sales will increase 50 per cent. The entire electronics industry will have sales worth $12.25 billion this year, pass $15 billion in 1960 and reach $22 billion in 1966. The industry will require $6 billion in new plant and equipment to maintain that pace. Five per cent of every nonmilitary sales

RADIO AND TELEVISION OUTPUT

IN THOUSANDS OF UNITS

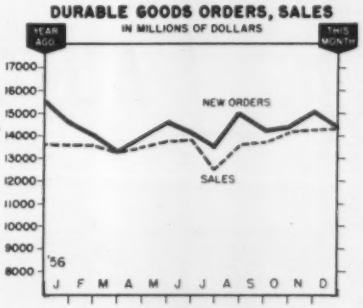


	Radio		Television	
	1956	1955	1956	1955
Jan.	1,079	1,068	588	655
Feb.	1,094	1,090	576	703
Mar.	1,360	1,482	680	831
Apr.	993	1,100	550	583
May	1,060	1,114	468	467
June	1,073	1,205	553	590
July	567	718	337	344
Aug.	991	948	613	648
Sept.	1,319	1,302	894	940
Oct.	1,349	1,500	821	760
Nov.	1,382	1,581	680	632
Dec.	1,715	1,786	627	605
Totals	13,982	14,895	7,387	7,757

Radio-Electronics-Television Mfrs. Assn.

DURABLE GOODS ORDERS, SALES

IN MILLIONS OF DOLLARS



	New Orders*		Sales*	
	1956	1955	1956	1955
Jan.	14,683	12,142	13,595	11,850
Feb.	14,107	12,170	13,593	12,029
Mar.	13,337	13,353	13,294	12,860
Apr.	14,073	12,879	13,519	12,805
May	14,732	14,331	13,754	13,322
June	14,185	14,033	13,850	13,527
July	13,513	13,571	12,627	13,503
Aug.	15,166	15,145	13,665	13,745
Sept.	14,266	14,936	13,692	13,692
Oct.	14,591	14,094	14,199	13,261
Nov.	15,130	14,680	14,321	13,721
Dec.	14,439†	15,605	14,390†	13,688

*Seasonally adjusted. †Preliminary.
U.S. Office of Business Economics.

dollar is going into research. Transistors will be a big item in this advancement. In 1956, sales were ten times what they were in 1955. This year will see a four-fold increase over 1956's. Factory sales of transistors totaled 12,840,000 units for the whole industry last year, says the Radio-Electronics-Television Manufacturers Association.

Index Levels Off

STEEL's industrial production index for the week ended Feb. 16 held at a preliminary 163 (1947-1949=100) for the second straight week. Considering the seasonal decline in the output of electricity, this must be considered a strong showing for industrial production (see page 53). The steel industry, operating at about 97 per cent of capacity, and the auto industry, turning out close to 172,000 cars and trucks a week, continue to be the backbone of the index.

PAs Cautiously Optimistic

"Cautious optimism" is a phrase being applied to the outlook of more and more businessmen. This week the Purchasing Agents Association of Cleveland comes up with the conclusion that although its members remain optimistic, they are cautiously so. In its latest report, the association reported only 84 per cent of its members think business is the same or better than it was in the previous month. This compares with 91 to 95 per cent in recent months. However, 36 per cent reported that new orders are better than they were a month ago, compared with only 30 per cent so reporting in the prior month's survey.

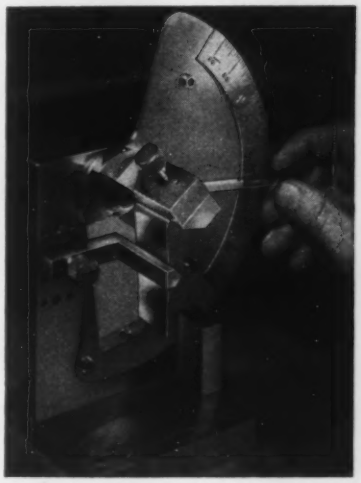
Refutes Pessimists

Armand T. Chandonnet, general manager, General Electric Co.'s Medium Steam Turbine, Generator & Gear Department, Lynn, Mass., says a tremendous upsurge in the power generating apparatus and marine propulsion equipment field refutes today's economic pessimists. "Our business," he says, "is one of the best barometers of the future economic health of the nation, and our business is at an all-time high." The department's scheduled output both for 1957 and 1958 will be close to 60 per cent higher than last year's record peacetime output.

MONEL • NICKEL • COPPER • ALLOYS

THIN STRIP

no standard is too exacting



Temper requirements for the thin nickel strip (.002") used in sensitive electronic tubes were too exacting to be checked by the usual methods. So Somers carefully hand checks several samples from each lot by the ultra-precise "bend test" illustrated above.

Since 1910 Somers Brass Company has specialized in producing thin strip: nickel and its alloys below .020" and copper and its alloys below .012" with the tensile properties, fatigue resistance, drawing properties and many other requirements which only the most exacting standards of production and quality control can meet.

Whatever your specifications may be, why not take advantage of Somers long experience? Write for field engineer or Confidential Data Blank for a complete survey of your problem at no cost or obligation.

FOR EXACTING STANDARDS ONLY

Somers

Somers Brass Company, Inc.
WATERBURY, CONN.

. . . with Magnethermic Induction Billet Heaters

Here's automation in an extrusion plant. Automatic billet loading, automatic billet temperature control, automatic control on the transfer of heated billets from the Magnethermic to press. These features increase quality and increase production.

These factors are influencing engineers throughout the country to specify Magnethermic Induction Heaters to meet their billet heating needs in new extrusion plants and as replacements for conventional equipment.

Remember in figuring the cost of heating, the profitable formula is not how much but . . . how much per billet.

Automation in Action
MAGNETHERMIC
Billet Heaters. . . .

INDUCTION HEATING
EQUIPMENT

MAGNETHERMIC®
corporation
3990 SIMON ROAD YOUNGSTOWN 7, OHIO

DAVID M. GASKILL
Brush Electronics post

SAMUEL N. PRITCHARD
Disston gen. sales mgr.

WILLIAM H. McKENNA
heads Hanlon-Gregory

JOHN C. LINSENMEYER
American-Standard exec.

David M. Gaskill was appointed manager of industrial equipment sales for **Brush Electronics Co.**, Cleveland, a division of Clevite Corp. He joined the firm in 1953 and later became supervisor of textile equipment sales.

Samuel N. Pritchard was named general sales manager, **Henry Disston Division**, Philadelphia, H. K. Porter Company Inc. He was branch manager for International Business Machines Corp. in Chester, Pa.

P. W. Morse was made general sales manager, **Magnethermic Corp.**, Youngstown. He was with the industrial heating division of General Electric Co.

Otto Svoboda, former sales manager, E. W. Buschman Co. Inc., was made sales manager of **May-Fran Engineering Inc.**, Cleveland.

John R. Broughton was named general sales manager, pipe products division, **Gladding, McBean & Co.**, Los Angeles.

Channing O. Davis was elected president, **Fuller Co.**, Catasauqua, Pa. He succeeds **A. E. Douglass**, now chairman. **G. K. Engelhart** was named president of Sutorbilt Corp. of California, a subsidiary. He also continues as a vice president of Fuller, and remains in Catasauqua.

Firth Sterling Inc. appointed **Kenneth E. McKown** product manager, Class I steel products and special shapes. He continues as superintendent, tool bit department.

William H. McKenna was elected president and general manager, **Hanlon-Gregory Galvanizing Co.**, Pittsburgh. He was vice president. **John Papa** was made plant superintendent.

Warner Electric Brake & Clutch Co., Beloit, Wis., named **Norman K. Anderson** vice president-general manager, Warner Industrial Division; **King DeSeve**, vice president-general manager, Warner Automotive Division.

Curtis D. Cummings, sales manager, Allison Division, was made sales manager of the **Campbell Machine Division**, American Chain & Cable Co. Inc., Bridgeport, Conn.

Herbert H. Blosjo was made product engineer, steel castings department, **Malleable Iron Fittings Co.**, Branford, Conn. He was chief metallurgist with Minneapolis Electric Steel Castings Co.

Ernest M. Fuller was made works manager of the North Grafton, Mass., plant of **Wyman-Gordon Co. Leo W. Ollila**, metallurgical manager, succeeds Mr. Fuller as works manager, Worcester, Mass., plant. **J. Robert Douslin**, plant manager at North Grafton, was promoted to district sales manager, Los Angeles.

Michael J. Myers was made sales manager. **Hynes Steel Products Co.**, Youngstown.

Sven E. Widen was made assistant sales manager, **Atrax Co.**, Newington, Conn.

John C. Linsenmeyer was elected an executive vice president-operations, **American Radiator & Standard Sanitary Corp.**, New York. He was president of the American Blower and Ross Heat Exchanger Divisions of the corporation. **John W. Brennan**, vice president-engineering of the American Blower Division, becomes its president. **Richard S. Reade** becomes president of Ross Heat Exchanger Division. He was executive vice president.

Mario A. Gardner was made director of purchases at **Consolidated Electrodynamics Corp.**, Pasadena, Calif.

Denison Engineering Division, American Brake Shoe Co., Columbus, O., appointed **Paul W. Norris** vice president and general manager; **Denison Neale**, director of sales.

Virgil E. Caldwell Jr. was named director of sales and contracts for the manufacturing division of **Topp Industries Inc.**, Los Angeles. Former midwestern representative at Dayton, O., he succeeds **Robert P. Gira**, recently made general sales manager.

Crucible Steel Co. of America, Pittsburgh, named **Felix Kremp** assistant product manager-high speed tool steel sales; **E. E. Lull**, assistant product manager-tool steel sales.

Kenneth A. Merz was made assistant chief engineer, Air Impeller Division, **Torrington Mfg. Co.**, Tor-

BARTLETT RICHARDS HARRY R. SANOW JOSEPH H. MYERS

Acme Steel appointments

rington, Conn. He was engineer in charge of product development.

Edwin G. Chapman was made manager of the experimental division of **Misco Precision Casting Co.**, at Muskegon, Mich. **Emery E. Kuhary** was made chief engineer of the division, reporting to Mr. Chapman. **Joseph W. Campau** was named manager of the Detroit division, reporting to **Joseph H. Cadieux**, recently made vice president-manufacturing.

George R. Heidenblut was elected vice president - engineering, **Midwest Mfg. Corp.**, subsidiary of Admiral Corp., Chicago.

F. J. Dowling was made central division sales manager, **American Can Co.**, at Chicago. He is succeeded by **S. J. Austin** as assistant sales manager.

Perry W. Pratt was made assistant engineering manager; **Willard L. Gorton**, chief engineer of **Pratt & Whitney Aircraft Co.'s** main Connecticut operations (East Hartford, Conn., facilities and its branch plants).

Floyd A. Fason was made manager of the Buffalo assembly plant of **Ford Motor Co.**

Gibson Electric Co., Pittsburgh, appointed **Raymond C. Hannegan** assistant to the president in addition to his duties as purchasing agent. **Miss Addie E. Glaub** was appointed buyer; **Malcolm Anderson**, marketing manager; **Fred R. Farnham**, sales manager; **Norman S. Hoyer**, manager of research and development.

Acme Steel Co., Chicago, elected **Bartlett Richards** vice president and presidential assistant. **Harry R. Sanow** was made vice president of Riverdale operations; **Joseph H. Myers**, general superintendent of the Riverdale plant.

Aluminum Co. of America, Pittsburgh, named **John H. Alden** assistant chief metallurgist, metallurgical division. **Howard J. Rowe** was named chief metallurgist, fabricating division.

Hiram Brown was made technical adviser to the plant manager at **Solar Aircraft Co.**, San Diego, Calif. He was chief metallurgist.

Herbert Parker was made Atlanta district manager for **Rockwell Mfg. Co.'s** meter and valve division.

Paul W. Hook was made executive vice president and treasurer, **Wellman Bronze & Aluminum Co.**, Cleveland. **Glenn F. Ihrig**, general sales manager, was made vice president-sales. **Gene Faubel**, sales engineer, is now assistant sales manager.

John W. Freund was made western district manager, metal products division, **Koppers Co. Inc.** He has headquarters in San Francisco.

John M. Miller was named assistant general sales manager, **Joyce-Cridland Co.**, Dayton, O. He continues as sales manager, automotive lift division. **Robert M. Tormey** was named sales manager, Jack Division; **Ralph Nyborg**, sales manager, Materialift Division.

Karl H. Fleishour was appointed superintendent, bloomers and billet mills, **Copperweld Steel Co.**, at Warren, O.

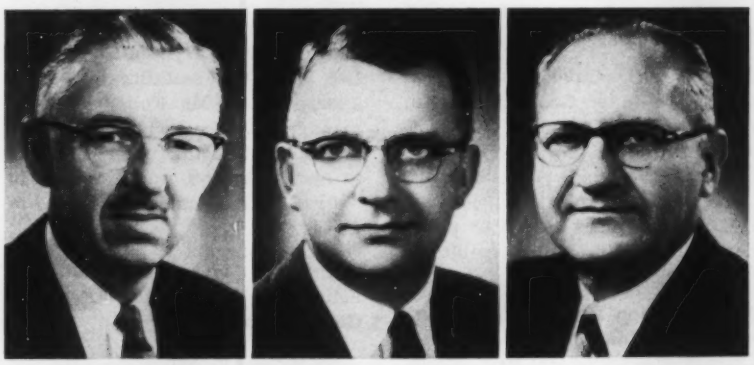
H. E. P. Barta joined **Pfaudler Co.**, Rochester, N. Y., as manager of the project engineering sales division.

Ralph C. Gibbs fills the new post of assistant purchasing agent at **Standard Pressed Steel Co.**, Jenkintown, Pa.

Dr. Gerald V. Kingsley succeeds **W. E. McCullough**, retired, as director of research for **Bohn Aluminum & Brass Corp.**

Harold R. Kohl was named manager - manufacturing engineering, Erie, Pa., foundries, **General Electric Co.** **Edwin S. Lawrence** becomes manager-manufacturing engineering, Schenectady, N. Y., foundries.

Joseph T. Ryerson & Son Inc. named **Scott Vrooman** Detroit sales manager to succeed the late **Harold E. Stavers**. **Bruce D. Clau-**



PAUL W. HOOK GLENN F. IHRIG GENE FAUBEL

Wellman Bronze & Aluminum appointments

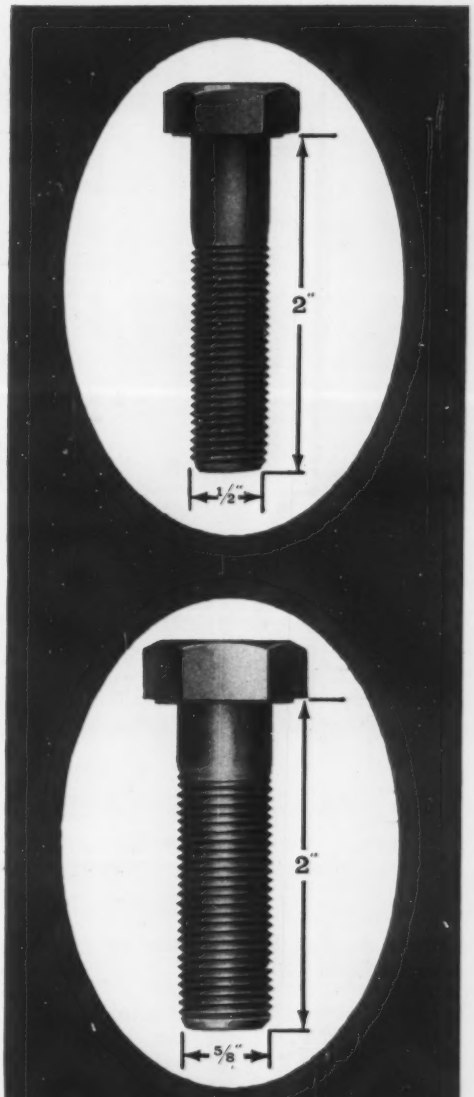
Which CAP SCREW is STRONGER?

The RIGHT Answer Can Save You Money These FOUR Ways:

- **SAVE** . . . ON INITIAL COST PER CAP SCREW
- **SAVE** . . . ON ASSEMBLY COSTS
- **SAVE** . . . ON SHIPPING AND INVENTORY COSTS
- **SAVE** . . . ON MATING NUTS

. . . And, In Addition, You Get A STRONGER, LIGHTER ASSEMBLY!

Appearances can be deceiving. For instance, of the two Cap Screws pictured at right, the one at top with the smaller diameter shank is the stronger. That's because it's a Lamson 1038 Double Heat Treated, high-tensile screw whereas the other is a more expensive Full Finished Cap Screw manufactured of a steel with lower tensile strength.



Ask for the Cap Screw with the "1038"—L on the Head.

Send for chart showing the relative strengths of these types of Cap Screws. It could mean important savings on your production line.

The Lamson & Sessions Company
1971 West 85th Street, Cleveland 2, Ohio

Please send me my free chart giving the facts on relative Cap Screw Strengths.

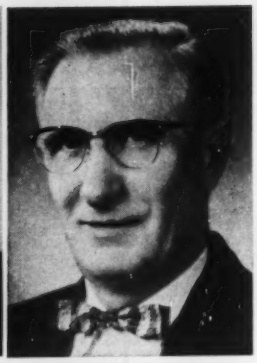
Name _____ Title _____

Company _____ St. & No. _____

City _____ Zone _____ State _____

GEORGE C. McCORMICK
Industrial Heating president

J. F. FORSTER
Vickers exec. v. p.



STEPHEN H. VAN SYKE
Pressed Steel Div. supt.

EARL A. NEEB
Titanium Metals plant mgr.

MELVIN L. WEINBERG
Putnam Tool v. p.

ROBERT G. HILL
Leece-Neville sales post

sonthue replaces Mr. Vrooman as sales manager, Chicago.

Earl A. Neeb was made plant manager of the Toronto, O., plant of **Titanium Metals Corp. of America.** He was general superintendent of hot rolling and slab conditioning, Brackenridge Works, Allegheny Ludlum Steel Corp.

Rear Adm. Curtis S. Smiley, USN, ret., was elected a vice president of **Sterling Precision Corp.,** New York, and general manager of its instrument division, Flushing, N. Y.

Joseph D. Allen Jr. was made eastern chief technical sales engineer for **Federated Metals Division,** American Smelting & Refining Co., New York.

L. C. Hewitt was elected vice president-research and development, **Ironton Fire Brick Co.,** Ironton, O.

Charles W. Lockhart was made sales manager, blower and air conditioning division, **Buffalo Forge Co.,** Buffalo.

Melvin L. Weinberg was elected vice president-sales and service, **Putnam Tool Co.,** Detroit. He has been sales manager since 1947.

Robert G. Hill was appointed sales manager, original equipment division, **Leece-Neville Co.,** Cleveland. He was a sales engineer.

Robert M. Haldeman, general manager of **Braden Copper Co.,** subsidiary of Kennecott Copper Corp., was appointed vice president. He is chief executive of the company in Chile, with offices in Santiago.

S. Howard Betts was named superintendent of **Youngstown Sheet & Tube Co.'s** 79-in. hot strip mill at the Campbell, O., Works. He succeeds **Ed O. Reese,** who became general superintendent of flat-rolled and tubular products.

Alvin H. Barrows was made assistant sales manager, Philadelphia district, **United States Steel Corp.** He succeeds **Boyd P. Doty,** now assistant sales manager, Detroit district.

George C. McCormick was elected president, **Industrial Heating Equipment Co.,** Detroit. He succeeds **Charles E. Buysse,** now chairman. **Clifton E. Wenger** was elected vice president and secretary; **Eugene K. Buysse,** treasurer.

J. F. Forster was elected executive vice president, **Vickers Inc.,** Detroit, in charge of all operations. He was made vice president and assistant general manager in 1949.

Stephen H. Van Syke was made superintendent of the Elyria, O., plant of **Pressed Steel Division,** Republic Steel Corp. He succeeds **George R. Schuler,** who was named product engineer for the division with headquarters in Cleveland.

Crucible Steel Co. of America appointed **Edward A. Fleming** manager, Philadelphia sales branch. He replaces **C. H. Stoeckle,** retired.

Hartfield-Hesly Supply Co. Inc., Buffalo, elected **Albert Segerlin** vice president. He is in charge of sales for western New York and northwestern Pennsylvania.

OBITUARIES...

N. L. Hite, who retired Dec. 31 as sales manager, wire division, **Continental Steel Corp.,** Kokomo, Ind., died Feb. 13.

William C. Martin Sr., 57, president, **United Steel Fabricators Inc.,** Wooster, O., died Feb. 14.

George E. Ford, works manager at Binghamton, N. Y., for **Fairbanks Co.,** died Feb. 10.

Harry W. Barkley, 52, president and general manager, **National Tool Co.,** Cleveland, died Feb. 3.

Sam Alfenbaum, 50, founder and president, **Abbott Steel Co. Inc.,** Buffalo, died Feb. 6.

Emil C. Krumheuer, 78, founder and president, **E. C. Krumheuer Co.,** Buffalo, died Feb. 8.

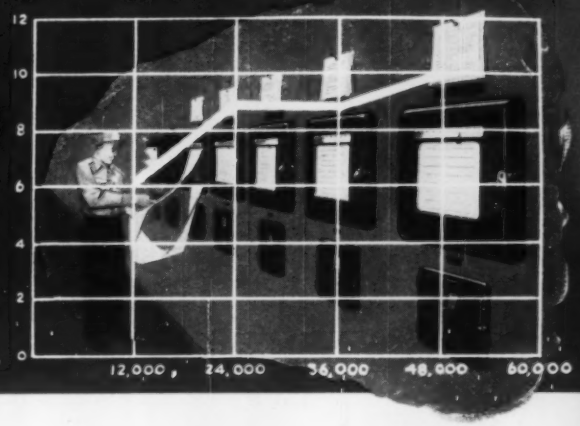
Jay O. Brelsford, 51, executive vice president, **Gate City Steel Co.,** Boise, Idaho, died Jan. 28.

Martin L. Ritter, sales manager, **Farrell-Cheek Steel Co.,** Sandusky, O., died Feb. 8.

Morris E. Olgin, 59, president, **Penn Iron & Metal Co.,** Erie, Pa., died Feb. 7.

SEVENTH OF A SERIES

Customer's Report



"We're getting an average of 9-tons per-man-per-hour with our Lee Wilson Single Stack Furnaces"

"Rising labor costs are of constant concern to us, and it's only natural to seek equipment that will make each man more productive," one of our older customers recently related. "It was with this thought that we originally purchased Lee Wilson Single Stack Annealing Furnaces. After two years of exclusive Single Stack operation, we are more convinced than ever that the Single Stack is the most efficient method of annealing yet developed. We're consistently getting as high as nine annealed tons per man per hour on a production of 30 to 35,000 tons per month — the best cost figures we've ever had, or heard of."

Before you place your order for annealing furnaces, make certain you've talked with Lee Wilson engineers about the fastest selling annealing furnace ever built — the Lee Wilson Single Stack.

Only Lee Wilson Furnaces Give You All These Advantages

1. GREATER FLEXIBILITY
2. MORE UNIFORM HEAT APPLICATION
3. IMPROVED CUSTOMER SERVICE
4. HIGHER PRODUCTION
5. BETTER LOAD FACTOR
6. MINIMUM PROCESS INVENTORY
7. REDUCED LABOR COST
8. BETTER OPERATING CONDITIONS
9. LOWER MAINTENANCE COST
10. REDUCED INSTALLATION COSTS

Lee Wilson* **ENGINEERING COMPANY, INC.**

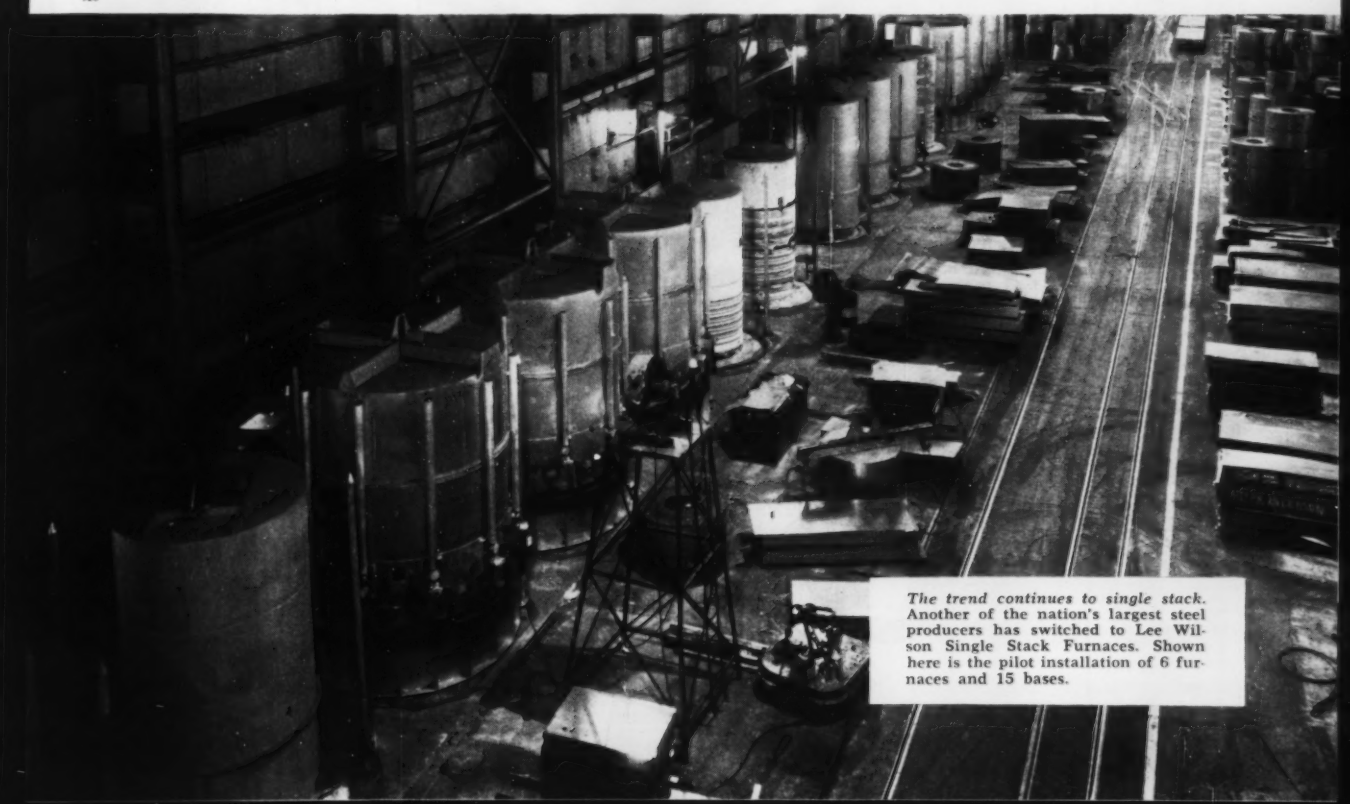
20005 WEST LAKE ROAD • CLEVELAND 16, OHIO

SINGLE-STACK RADIANT TUBE ANNEALING FURNACES

MAKE THE BEST METALS BETTER

* ORIGINATORS AND LEADING PRODUCERS OF SINGLE-STACK RADIANT TUBE FURNACES

125



The trend continues to single stack. Another of the nation's largest steel producers has switched to Lee Wilson Single Stack Furnaces. Shown here is the pilot installation of 6 furnaces and 15 bases.

How T&W Technique serves the off-the-highway truck industry better

At the right are two examples of the *special* results produced by *T & W Technique* to meet the particular needs of makers of off-the-highway trucks. T & W offers you a completely coordinated team of engineering and production facilities, to furnish forged or stamped parts or assemblies which usually cost you less at your point of assembly.

Write today for full information.

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FORGINGS
AND DEEP DRAWN
STAMPINGS

TRANSUE & WILLIAMS
Over 50 years of experience
ALLIANCE, OHIO—USA

Form Zirconium Firm

National Distillers teams up with Mallory-Sharon. They'll build plant at Ashtabula, O.

A NEW COMPANY, Reactive Metals Inc., has been formed by Mallory-Sharon Titanium Corp., Niles, O., and National Distillers Products Corp., New York.

The firm will melt zirconium and its alloys and make certain zirconium mill products. Later, it is hoped that production may be expanded to include other metals for the atomic energy program, such as hafnium, columbium and thorium.

Construction of manufacturing facilities will begin soon at Ashtabula, O., site of National's zirconium sponge plant.

Reactive Metals will operate independent of Mallory-Sharon's activities in the titanium field and National Distillers' manufacture of titanium and zirconium sponge through its U.S. Industrial Chemicals Co. Division.

Simonds To Build Office

Simonds Saw & Steel Co., Fitchburg, Mass., is erecting a 40,000 sq-ft sales office and service shop in Shreveport, La., to serve as a distribution and service center for the firm's line of industrial cutting tools in the surrounding nine-state area. It is scheduled for occupancy by early spring.

Alcoa Forms New Division

Aluminum Co. of America, Pittsburgh, has formed a new division to develop special blends of aluminum pastes and powders for use as pigments in plastics, paper coatings, printing inks and fabric finishes. Thomas L. Sullivan will head it.

Joins Press Departments

Baldwin-Lima-Hamilton Corp., Eddystone, Pa., has transferred its hydraulic and compacting press department from the Eddystone Division, near Philadelphia, to the Hamilton Division, Hamilton, O. Manufacturing and sales of the hydraulic department are now integrated with the mechanical press department.

Bellevue Tube Expands

Bellevue Tube Co., Philadelphia, has installed automatic and semi-automatic fabricating and finishing equipment to increase its production more than 100 per cent. The goal for TV tables alone is 5000 daily.

Crane Buys Vandalia Plant

Crane Packing Co., Morton Grove, Ill., has purchased and put into operation a one-story plant in Vandalia, Ill. It will produce mechanical seals for pumps, compressors, speed reducers and other rotating shaft equipment.

New Instrument Firm Name

Daco Machine & Tool Co., Brooklyn, N. Y., has changed its name to Daco Instrument Co. Alois Stauber, president, said the change was made because of the firm's increased activities in instrumentation.

Brass Firm Changes Name

Empire Brass Mfg. Co. Ltd., London, Ont., has changed its name to Emco Ltd. J. H. Stevens, president, said expansion into wholesale plumbing, heating and industrial supplies prompted the new name.

Selas Forms European Company

Selas Corp. of America has formed a European subsidiary to simplify and increase its export business. The new subsidiary, known as Selas Corp. of America, European Division, S.A., will be headquartered in Geneva, Switzerland.

Valve Company Reorganizes

Golden-Anderson Valve Specialty Co., Pittsburgh, has reorganized to handle its expansion (goal is to double present business) and its acquisition of an Ohio firm. Grant A. Colton, president and general manager, has become chairman of the new group which purchased all

HERE'S HELP for your tooling problems

Looking for a tool steel to do a specific job? Want to know where to buy a finishing carbide? This guide has the answers. It is a single source of information on more than a thousand different tooling materials. Knowing the job to be done, you can determine, with the guide, what product to buy and where to buy it. Cross indexes make it easy to locate tool steels and carbides by tradename, or to compile a list of sources for a single type.

40 PAGES

Copies of the Guide to Tool Steels & Carbides are available from Editorial Service, STEEL, Penton Bldg., Cleveland 13, O., at the following prices:

1 to 10	$2.00 ea.
11 to 50	1.90 ea.
51 to 100	1.80 ea.
101 to 200	1.70 ea.
over 200	1.60 ea.

outstanding stock. John H. Kilmer Jr., is executive vice president. Paul B. Brauer is treasurer.

Machine Firm Incorporated

Alfred Vaiksnoris, Helen Zimmisky and Joseph Zimmisky, have incorporated the Ashley Machine & Tool Co., at Wyoming, Pa., to manufacture tools, dies, jigs and fixtures.

New Oxygen Plant To Go Up

Linde Air Products Co., New York, will build a large capacity oxygen plant, at a reported cost of over $3 million, on its property at Sault Ste. Marie, Ont. It is expected to supply the requirements of Algoma Steel Corp.'s expanding operations.

Adds Second Boring Mill

J. B. Beaird Co. Inc., Shreveport, La., producer of heavy steel products, has expanded its operation with a universal horizontal boring mill with a 4-in. bar, the second to be added in the last 18 months.

New Hagan Plant Operating

Hagan Chemicals & Controls Inc., Pittsburgh, opened a processing and packaging plant for its Calgon products at Rockwood, Mich., on Feb. 7. Plant manager is William G. Howard.

Carbide Plans Skyscraper

Union Carbide & Carbon Corp. will build a 52-story headquarters building in New York. Cost: $46 million. The 750-ft structure, expected to accommodate 5000 people, will contain about 1.5 million sq ft of space. Tentative completion date is early 1960.

Expands Metal Building

Bernard P. McDonough, president, Parkersburg-Aetna Corp., Parkersburg, W. Va., has announced the expansion of its metal building activities into a separate division of the firm's Parkersburg Rig & Reel Co. The Metal Building Division will be under the direction of Corbie L. Wilson, general manager.

Titanium Fasteners

Huck lock bolts for airframes to be manufactured by Standard Pressed Steel Co.

TITANIUM lock bolts for airframes will be manufactured for the aircraft industry by Standard Pressed Steel Co., Jenkintown, Pa.

Huck Mfg. Co., Detroit, has licensed the firm to produce its proprietary lock bolts from the lightweight metal.

Standard says the Huck bolts will be as strong as their steel counterparts, which are widely used in plane manufacture, but will permit vital weight savings.

Takes Name of Trademark

Northern Indiana Brass Co., Elkhart, Ind., has become NIBCO Inc. The new name has been used as a trademark for many years.

Worley Steel Organized

D. E. Worley, former director of purchases and traffic for the Mosher Steel Co., Houston, has organized the Worley Steel Co. The Houston-based firm will distribute and warehouse steel and allied products.

Opens Canadian Affiliate

Sheffield Corp., Dayton, O., has established an affiliate, Sheffield Tool & Gage of Canada Ltd., at Windsor, Ont.

Takes Over Plastic Pipes

Page-Hersey Tubes Ltd., Toronto, has taken over the manufacture of plastic pipes from a subsidiary, Plastic Pipes Ltd., Renfrew, Ont. Facilities have been moved to Page-Hersey's steel pipe mill at Welland, Ont.

Fawick Has German Clutch

Thomas L. Fawick, chairman and president of Fawick Corp., Cleveland, announces an arrangement with Wilhelm Binder, KG, Villingen, Germany, for exclusive patent rights and a license to manufacture and distribute the Binder magnetic clutch in the Western Hemisphere. The product will be known as the Fawick magnetic clutch and will be made to American specifications and requirements.

Doubles Warehouse Capacity

Crucible Steel Co. of America, Pittsburgh, has doubled the capacity of its warehouse and expanded its sales office in Philadelphia.

CONSOLIDATIONS

General Fittings Co., East Greenwich, R. I., purchased **Hayden Heater Co.**, Easton, Md. Hayden's manufacturing facilities have been moved to East Greenwich where they will continue as the Hayden Heater Division. S. J. Hayden is general manager of the division.

General Controls Co., Glendale, Calif., manufacturer of atomic controls, acquired **Production Instrument Co.**, Chicago, producer of mechanical and electrical counting devices.

REPRESENTATIVES

Revere Copper & Brass Inc., New York, appointed Precision Steel Warehouse Inc., Chicago, as its aluminum products distributor in the Chicago metropolitan area. Precision will handle flat and coiled sheets.

NEW ADDRESSES

Link-Belt Co., Chicago, moved its New Jersey district office from Newark to larger quarters at 293 Morris Ave., Summit, N. J. H. G. Anderson is district manager.

On Mar. 1, **Metal & Thermit Corp.**, New York, will move its Atlanta sales offices to its warehouse at 565 Western Ave. N.W., that city. Stocks of mild steel, alloy steel, stainless and hard facing welding electrodes will be maintained at that facility. C. E. Davis Jr. is southeastern regional manager of the Welding Division.

NOW! CLEANING COSTS DROP AGAIN

NEW and BIGGER SAVINGS effected in 5 areas by the new WHEELABRATOR® SUPER TUMBLAST

"Abrasive costs reduced 68% . . . no direct labor required for cleaning . . . original blades last 696 hours . . . castings cleaned 29% faster . . . no parts replacement required in first 2 months . . . blade costs cut 63.2%." Reports like this keep coming in from Super Tumblast installations in the field. Savings pile on savings. Operating economies, maintenance savings and increased productivity are combined in the Super Tumblast to give a new dimension to blast cleaning.

cleaning time drops again

parts costs drop again

abrasive cost drops again

maintenance costs drop again

man hours drop again

The Super-Capacity Wheel throws more than twice the abrasive in a more uniform pattern than any similar sized wheel previously used. Contaminants cannot retard cleaning because the abrasive separator, with 3 times the air separation area, assures having super-clean abrasive at all times.

The Super-Efficient Separator removes all highly-abradant contaminants before they can damage machine parts. The entire efficiency of the machine is thus increased, downtime is kept to a minimum and large savings are effected in parts costs.

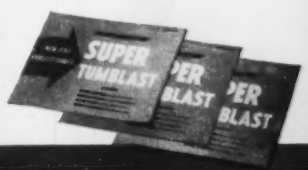
The Super Tumblast gets more mileage from abrasive in 2 ways: First, it keeps all abrasive in the machine through a new Super-Sealed construction. Second, it removes all contaminants from the abrasive without removing any of the abrasive itself.

The entire Super Tumblast is designed for lowest maintenance. For example — high wear points are protected by Long-Lyfe liners with 25 to 50 times longer life. The cleaning chamber is super-tight. The power-operated, one-piece reinforced door withstands impacts from inside and outside. The wheel has new blades for longer wear, a strain-free blade holding device, a new easy-service wheel guard housing, and a new system of wheel guard liners.

This is the first batch-type mill designed to provide the reliable performance required for automatic operation. It is readily converted to automation because of standard features such as power door, power closing plate, power abrasive controls, etc.

SUPER TUMBLAST now in 3 SIZES

Super Tumblast super savings are available to more plants because it comes in 3 sizes . . . 7 cu. ft., 14 cu. ft., 28 cu. ft. Write for literature.



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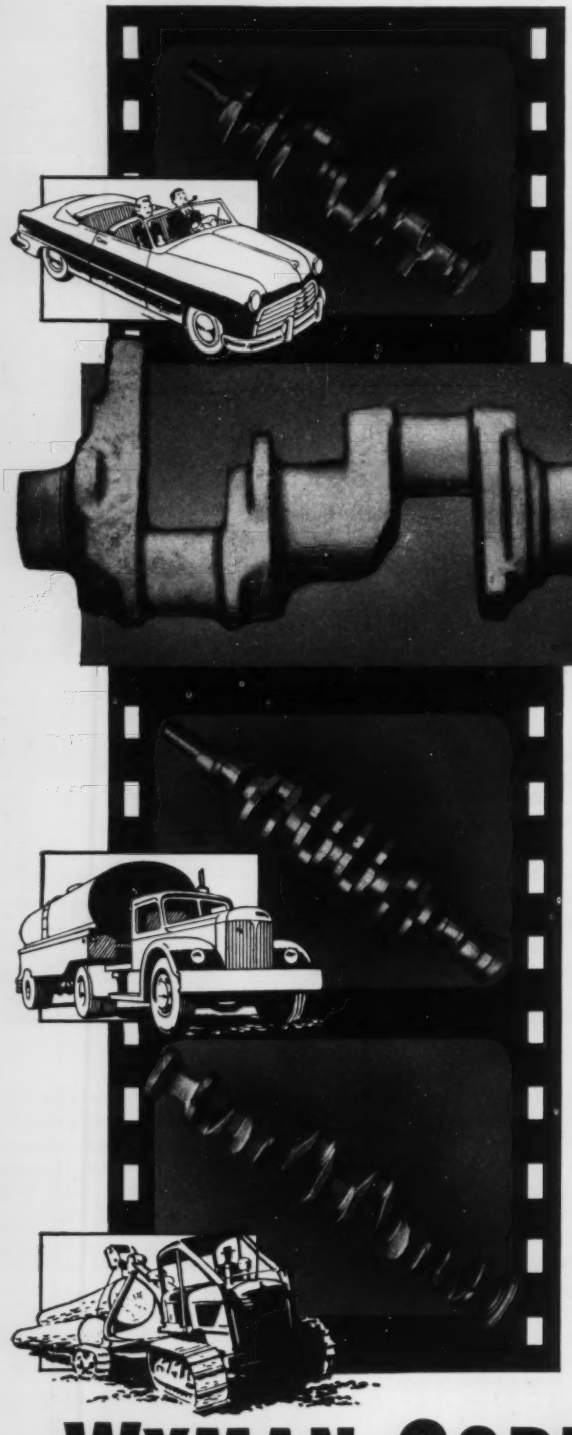

There's no substitute for the FORGED crankshaft

Crankshafts have been made successfully by other methods of fabrication and have proven to be *good enough* for certain non-critical applications—but for maximum dependability of the modern, compact, high compression, high torque engine a forged crankshaft is essential.

The forging process assures, to the greatest degree possible, uniformity and predictability of physical properties with a minimum variance from piece to piece or from one location to another in the same piece.

Wyman-Gordon has been forging crankshafts since the beginning of the internal combustion engine era and today produces more crankshafts for a greater variety of applications than any other company in the world. In a crankshaft there is no substitute for a forging, and in a forging there is no substitute for Wyman-Gordon quality and experience.

WYMAN-GORDON COMPANY

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WORCESTER 1, MASSACHUSETTS
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FORGINGS OF ALUMINUM • MAGNESIUM • STEEL • TITANIUM

Technical Outlook

DIAMOND SUBSTITUTE— GE has a new material (borazon, a cubic boron nitride) that's as hard as a diamond and stays hard at temperatures hot enough to destroy a diamond. Dr. C. G. Suits, vice president and director of research, says borazon crystals will be marketed soon. Their resistance to heat will permit superior mountings and, compared with diamond tools, higher surface speeds for cutting and polishing.

SOLVES CORROSION PROBLEMS— An all-plastic pump (without stuffing box or seals of any sort) may solve problems of handling corrosive solutions in finishing operations. Westinghouse Electric Corp., Metuchen, N. J., uses it to pump a concentrated ferric chloride solution which etches printed circuits. Vanton Pump & Equipment Corp., Hillside, N. J., makes it.

PRESS FOR HOT MATERIALS— Loewy - Hydropress Division, Baldwin - Lima - Hamilton Corp., New York, has built a press for the AEC which shapes radioactive materials. Operated by remote control in a sealed chamber, it uses the Marform process (Guerin rubber pad combined with a steel forming die).

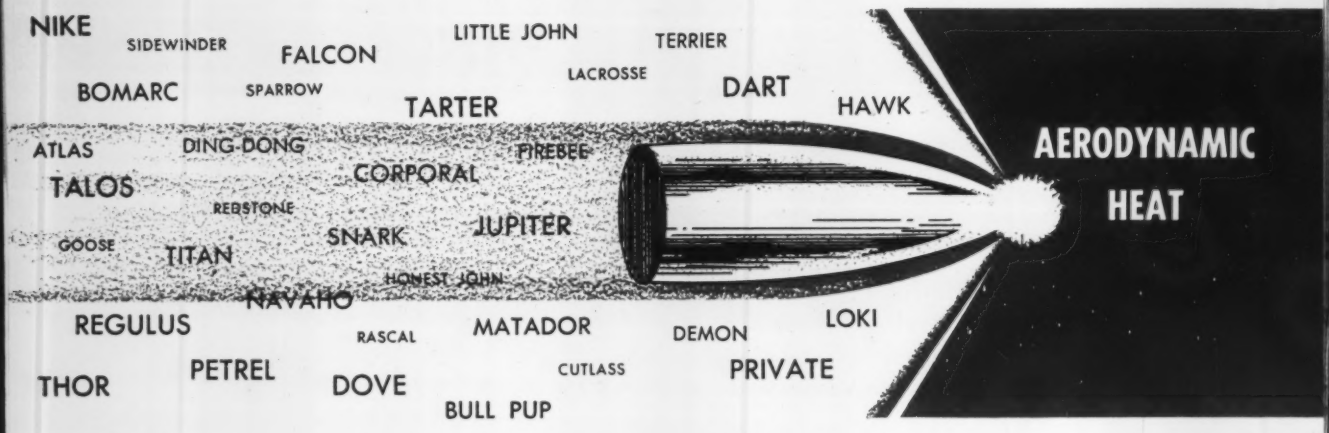
NEW GLASS LUBRICANT— Two dispersions of glass in isopropyl alcohol give a protective and lubricating coating for the forging of special alloy steels, titanium and other metals. The dispersion is applied at room temperature and drys to a film which checks oxidation and surface contamination during the heating cycle. At forging temperature, the glass fuses to the surface to produce a hydrodynamic film for forming. The die is pretreated with Aquadag (a dispersion of colloidal graphite in water) to prevent the molten glass from sticking to it. A test with a superalloy showed that the dual treatment more than doubled die life. Both the glass and graphite dispersions are made by Acheson Colloids Co., Port Huron, Mich.

HIGH TEMPERATURE SOLDER— A new self-annealing tin base solder gives high creep strength yet can be applied at lower temperatures than silver solders and brazing alloys. One use: Soldering flanges to the barrels of wave guides. It's called #38 alloy by its maker, Alpha Metals Inc., Jersey City, N. J.

HIGH TEMPERATURE COATINGS— The interface between the basis metal and its protective coating can be the key to the success of a part in high temperature service, says Dr. Charles L. Faust, Battelle Memorial Institute. Speaking at a symposium on heat tolerant metals at Albuquerque, N. Mex., he said that preparation of the basis metal and bond strength between the coating and the basis metal are of major importance to adherence of the coating. Preparation includes final physical and chemical cleaning and also the last surface finishing operation.

IN THE CARDS— Westinghouse (which made the punch-card controls for Jones & Laughlin's new automatic reversing roughing mill) believes the advantages of the system are so substantial that "every new mill and every old mill slated for redesigning will have to be equipped with automatic control equipment to be competitive."

Metalworking Outlook—p. 47 *Market Outlook—p. 129*



Needed: Materials for Missiles

Strength at elevated temperatures is the first requirement. Possibilities: Noble metals, new steel and titanium alloys, metal-ceramic combinations

SPENDING on missile procurement in the U.S. has zoomed from $21 million in fiscal 1951 to an estimated $1.5 billion in the fiscal year ending June, 1957.

The federal budget given to Congress last month estimates that $2.03 billion will be spent for guided missiles in fiscal 1958. Spending for aircraft in the same period will be $6.73 billion.

General Nathan Twining, Air Force chief of staff, recently said that by 1961 he expects 50 per cent of the Air Force procurement budget to be spent on missiles.

Boom Industry — Government and private industry have $6 billion to $7 billion invested in guided missile plants and production with more than 100,000 employed in various phases.

Most missiles and systems (see above) have been developed and

Specs for Missile Metals

By EDWARD A. LORIA
Staff Metallurgist
Crucible Steel Co. of America
Pittsburgh

Requirements of new models call for major breakthroughs in development work. Intensive research on lubricants, elastomers and structural metals is under way

MISSILES now under development are creating aerodynamic heating problems at every level between the relatively subdued Mach 3 aircraft and the Intercontinental Ballistic Missile (the ICBM).

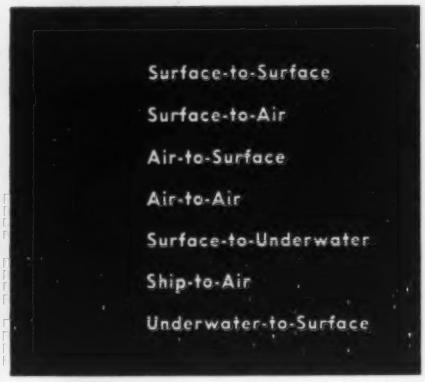
The designer's first problem is to find materials to meet strength and temperature requirements and then, if he has a choice among materials, to consider the weight factor. This approach poses a problem to metallurgists which can be solved by the development of noble metals, new steel and titanium alloys, and metal-ceramic combinations.

Knowledge—We must study the four thermal quantities of structural metals—specific heat, thermal conductivity, thermal expansion and density—at the maximum temperatures at which they are usable. These are the design parameters required to compute the temperature distributions and thermal stresses that will accompany aerodynamic heating or heat from other sources.

Also, mechanical properties at elevated temperatures must be known because a space vehicle must not only be capable of withstanding aerodynamic heating, but while hot must sustain large surface loadings.

Materials—The noble metals will get first consideration for the extreme temperature areas. Platinum alloy-clad copper may enable the ICBM warhead to cope with the intense heating of re-entry. Some of the nose cones of the satellite launching vehicles may be tipped with platinum.

Platinum is a possible cladding material to make molybdenum oxygen-resistant for high temperature use. Platinum, palladium and other members of the same family in the periodic table are similar in many ways, but their



produced since February, 1945. Coming up is a new family of birds which will add new dimensions to air travel.

Problems — While immense strides have been made, many problems remain unsolved. Most urgent is the need for materials that meet unique requirements.

The challenge was spelled out late last month when the Air Research & Development Command (ARDC) took part in a symposium at the 25th annual meeting of the Institute of Aeronautical Sciences in New York.

Aims—Outlining ARDC's materials research effort, Brig. Gen. Marvin C. Demler, deputy commander for research and development, stated: "It is not enough merely to advance material in tune with technical developments in other fields. Nor will it suffice to make incremental improvements. What we need are major breakthroughs all along the line."

You get a better idea of what General Demler had in mind by looking at where we stand. Take the high temperature problem. The alloys of iron, nickel and chromium have been extensively developed—they have limited capability beyond 1800 to 2000°F.

Carbon—Among high temperature materials, carbon is probably the best, but it has many structural disadvantages. Intensive efforts are under way to improve carbon and its allotropic forms, H. C. Sullivan of the materials laboratory at Wright Air Development Center told the symposium.

Alloys of molybdenum, columbium (niobium) and tantalum are getting a lot of attention now. Lack of oxidation resistance is limiting the use of molybdenum and columbium. But an intensive coating development program is starting to show promise, Mr. Sullivan revealed.

Thermophysicals — For some missile applications, a material can be selected on the basis of its thermophysical properties in preference to mechanical properties.

In some experimental uses, the high specific heat of magnesium could make it a choice over titanium or aluminum. The same is true of copper because its thermal properties overshadow its mediocre mechanical ones.

Another Attack—How can you get around the heat problem? Two possibilities suggest themselves—regenerative cooling (circulating a coolant beneath the skin of the missile) and transpiration cooling (pumping liquid coolant through a porous skin to cool the surface it is being forced through).

Recent developments in liquefied gases — particularly hydrogen—make pumping attractive to missile designers.

Other Problems—Metals aren't the only materials involved. Missile experts are also concerned with the elastomers. Liquid rocket differences make them useful for supplying the qualities of one to another through alloying.

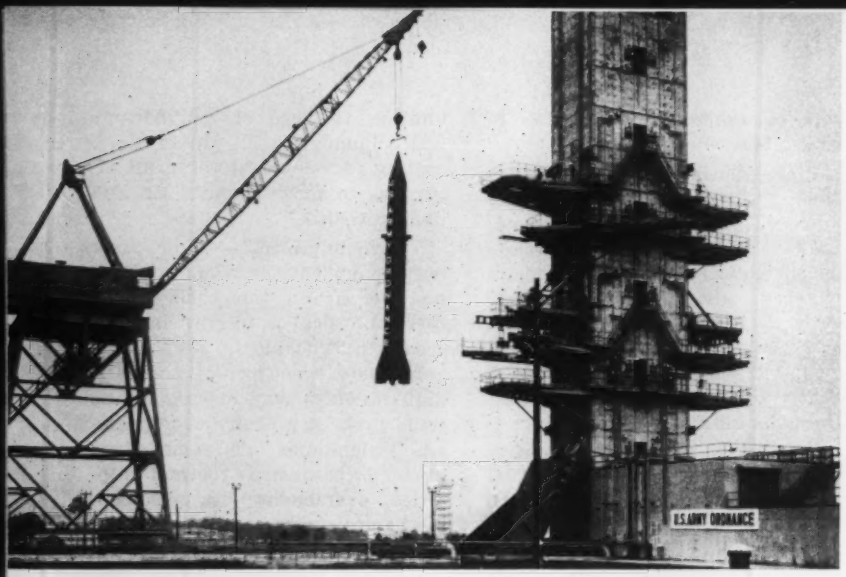
Advantages — Their basic advantages are chemical stability, high reflectivity, high melting points, relatively low vapor pressures, high strength and ductility, and relatively low coefficients of expansion. At high temperatures, slight oxidation occurs over a small temperature band. The oxide decomposes or vaporizes once that band is past and leaves a shiny surface.

The performance of platinum metals under critical, ultrahigh temperature should be studied. There is the possibility of sudden instability if: 1. The heating rate is too high. 2. Or if subjected to temperature and pressure in an oxygen-nitrogen atmosphere.

Other Metals—Titanium, stainless and alloy steels will probably be widely used in the lower temperature areas of missiles. Such

Metallurgical Requirements for Missiles

Design Criteria	Material Requirements
Airframe Structure	
Lightness	Low specific gravity
Stiffness to retain aerodynamic shape	High strength at moderate and high temperatures
Resistance to high mechanical stresses	High elastic modulus
Resistance to moderate and high temperatures	
Airframe Surface	
Lightness	In addition to above:
Resistance to aerodynamic heating	Adequate corrosion resistance
Resistance to corrosion	Good formability
Resistance to high stresses	
Connecting Elements	
High dimensional tolerance	High strength at moderate and high temperatures
Resistance to high mechanical loads with superimposed vibration	High fatigue strength
	Low notch sensitivity
	Material compatibility
Flame Protecting Elements	
Ability to insulate	Adequate strength at high temperatures
Resistance to high surface heat	Low thermal conductivity
Resistance to high gas velocity	High surface emissivity
	Oxidation resistance
	Erosion resistance



The Redstone, a surface-to-surface ballistic rocket, is the biggest missile that has been flown. Here, a crane swings it toward a test tower

MATERIALS . . .
propellants require tanks, hoses, seals, gaskets and other rubber items for their retention.

Many of the liquid propellants are extremely detrimental to the elastomers. Moreover, other potential fuels, such as fluorine, liquid oxygen and hydrogen, create even more problems because of the corrosive nature of the fuel and the extremely low temperatures involved.

Radiation—Nuclear radiation is another hurdle. The President's budget for fiscal 1958 for the first time publically mentions that atomic reactors are being developed for the propulsion of guided missiles.

Exposure of natural rubber to radiation results in a progressive loss of elastomeric properties. Continued effort is aimed at the development of radiation resistant elastomers.

Best Bet—In all probability, said Capt. Martin H. Brewer of ARDC's equipment and materials division, the greatest hope for significant accomplishment is new polymer development. A fluorinated polyester rubber has been developed which has good fuel resistant properties at −65 to 300°F.

Modified silicone rubber, usable at both temperature extremes but possessing poor fuel and oil resistance, is being studied by introduc-

METALS . . .
alloys must withstand high stresses in the −300° F to 1500° F range. Good elevated temperature tensile properties for short time intervals are necessary, and properties near the melting point should be studied. Tests at high heating rates will reveal thermal shock effects. Creep and stress rupture are not critical in missile design because time is not a factor.

To compete effectively with titanium on a weight basis, steels must develop strengths over 200,000 psi. The martensitic stainless grades offer the most promise.

Best Steels—Types 420, 422 and 422M have been successful in this respect. The pseudo-austenitic 17-7PH and AM-350 and their new counterparts PH 15-7 MO and AM-355 deserve consideration. The austenitic, precipitation-hardening grades A-286 and HNM retain their strength much better at higher exposure temperatures.

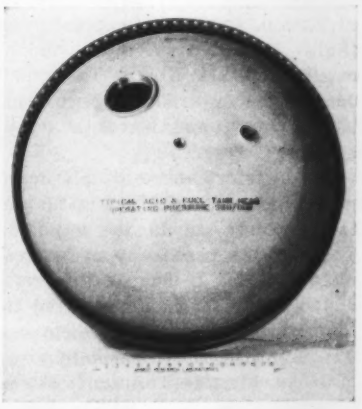
Advantages of the martensitic steels, compared with the austenitic types, are their lower coefficients of thermal expansion and higher thermal conductivity. A disadvantage is the dimensional changes that occur in heat treating, which are greater than those in stable austenitic steels, such as HNM or A-286.

Thermal Capacity — Foremost of the structural problems is the thermal capacity of the outer surface of the missile that must travel at high speed at moderate altitudes. The short time during which this condition persists tends to reduce the total quantity of heat. However, the heating rate during this time might be quite severe.

An unfortunate effect of elevated temperatures on the mechanical properties of structural metals is a marked reduction in strength and stiffness. There may be an effect of temperature on ductility and on the thermal and mechanical shock resistance. The metallurgist must select materials which are suitable for the anticipated flight pattern of the missile.

Re-Usable Missiles — When a vehicle is intended for repeated use, it is necessary to soak up the heat in a heat sink for dissipation after the missile is in outer space or on the ground. In this case, the important metal property characteristics are thermal conductivity (to take heat away from the skin), heat capacity (to store the heat removed) and melting point (to maintain high temperature strength while providing heat resistance).

For a short heating time, conductivity is important since it affects the depth of heat penetration.



Acid and fuel tank head for guided missile made from 17-7 PH stainless

ing fluoro-alkyl groups in the side chains. Several systems are under study in the inorganic polymer area.

Lubricants—The severe temperatures associated with missiles has caused the Air Force to place thermal stability at 700°F at the top of its list of lubricant criteria.

Other criteria for missile lubricants include corrosion-oxidation resistance, viscosity - temperature characteristics, lubricity on bearing surfaces, compatability, hydrolytic stability, flash point, spontaneous ignition temperature, heat transfer characteristics, vapor pressure characteristics and compressibility. All must be considered when developing a fluid for 400°F or higher.

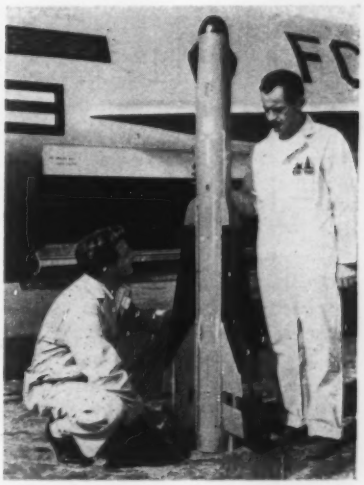
ARDC categorizes hydraulic fluids into four types (see table). The first two are in use today. A typical compound in the Type II class shows a change in stable life of from 3000 hours at 200°F to 60 hours at 300°F, with a probable life of 200 to 300 hours.

The Type III fluids have an estimated temperature capability of −65 to 400°F. Fluids have been developed and tested in mock-ups. These materials fall into the chemical category of silicate esters with additives.

Higher — In the 700°F range, ARDC is concentrating on the chlorinated silicones, stated Lt. Col. L. T. Taylor of ARDC's equipment and materials division. Development currently is aimed at a fluid with 10 to 20 hours of life at 700°F, and good possibilities of improvement by additives.

In the 800°F range, the prospect of obtaining a stable organic material for immediate development is practically nil, explained Colonel Taylor. Data from test tube quantities of materials, synthesized in basic chemical studies, indicate semiorganic materials may have possibilities.

Greases—In the development of 700°F greases for electrical and pneumatic equipment, high melting organics and inorganic materials are being screened as potential thickening agents. Acceptable greases have been made with glass



The Falcon air-to-air missile can be carried by a jet interceptor

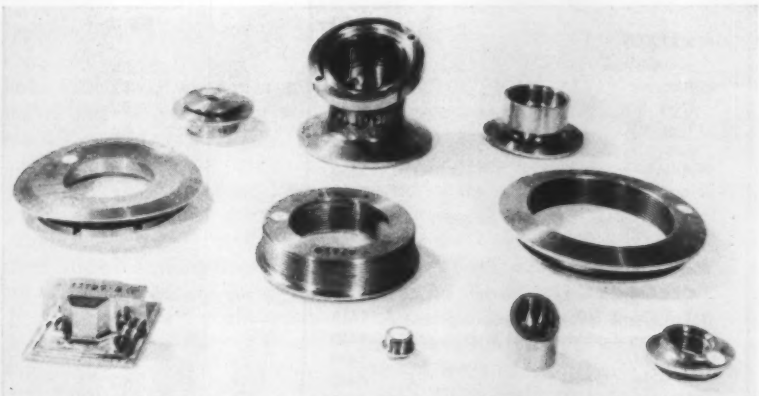
For a longer heating time, heat capacity and melting point play a predominant role.

One Way—With single trip missiles, the surface can be damaged by its passage through the atmosphere, but it must not be excessively weakened. Metals which absorb heat by fusion and surface evaporation are applicable. However, their use creates problems, and a great deal of work must be done to obtain a thorough understanding of the interaction of the vaporizing surface and the high speed air.

Heat effects might be alleviated by allowing certain parts of the missile to melt. The melting process would be similar to that of meteorites that fall to earth—melting occurs at the surface while the interior remains relatively cool. It may be necessary to resort to fuselage nose cone and aerodynamic leading edges that have a built-in system of progressive, calibrated deterioration, using materials that sublime at high temperatures and use up heat doing so.

Solar Furnace—A powerful new tool being used to tackle high temperature problems of missile flight is the large solar furnace which generates temperatures over 6000° F. Among other things, the furnace will be used to investigate the behavior of potential materials at extremely high temperatures. Exposure to heat will be controlled to prevent immediate vaporization. A study of missile structures under high rates of heat transfer and duplicating thermal effects of nuclear weapons also will be possible.

During its high speed passage through the earth's atmosphere, a missile is exposed to a rate of change of temperature several times that for a cold water quench. Such rapid changes in temperature result in big temperature differences for neighboring parts of the structure with corresponding internal stress problems. If a design



Guided missile parts made of Armco 17-7 PH steel bars and forgings. They were machined in Condition A and heat treated to Condition TH 1050

MATERIALS . . .

fibers as thickening agents.

Dry friction reducing coatings offer good possibilities for slow speed uses in oscillatory motions under light to heavy loads. Present materials are similar to paint films with graphite and molybdenum disulphide.

General Demler summed up the reasoning behind ARDC's intensive research program: "Our future depends to a large extent on what we do today to strengthen our airpower of tomorrow. With materials being the key to progress in airpower, our combined efforts (government and private industry) in solving the pressing problems which face us will be of vital importance to all of us."

ARDC's Classification of Hydraulic Fluids for Missiles

Class	Usable Temperature Range	Compounds
Type I	−65 to 160°F	Mineral oil with additives
Type II	−65 to 275°F	Mineral oil with additives such as viscosity index improver, oxidation inhibitor and antiwear agent
Type III	−65 to 400°F	Silicate esters with additives such as viscosity index improver, oxidation inhibitor and metal deactivator
Type IV	0 to 550°F	Silicate esters
	0 to 700°F	Chlorinated silicones
	−40 to 800°F	Semiorganic materials
	0 to 1000°F	

METALS . . .

is selected which offers little restraint to thermal expansion, there is still the problem of matching the cool internal structure to the hot expanded outer surface. For many metals heated to within 10 to 20 per cent of their melting point, this expansion or growth of the outer surface is 1 to 2 per cent.

Expansion—All missile designs will have to consider thermal expansion, and means of controlling or allowing for this will be of great importance. Metals with thick cross sections tend to fracture under the savage internal stresses set up when the outside gets hot while the interior remains cool.

The solution lies in the use of a metal with a low coefficient of expansion to withstand the thermal stress and warping. Nickel, when added to steel in the proper amount, reduces the coefficient of expansion markedly; a nickel-bearing alloy called Invar has a value only 1/30 that of steel.

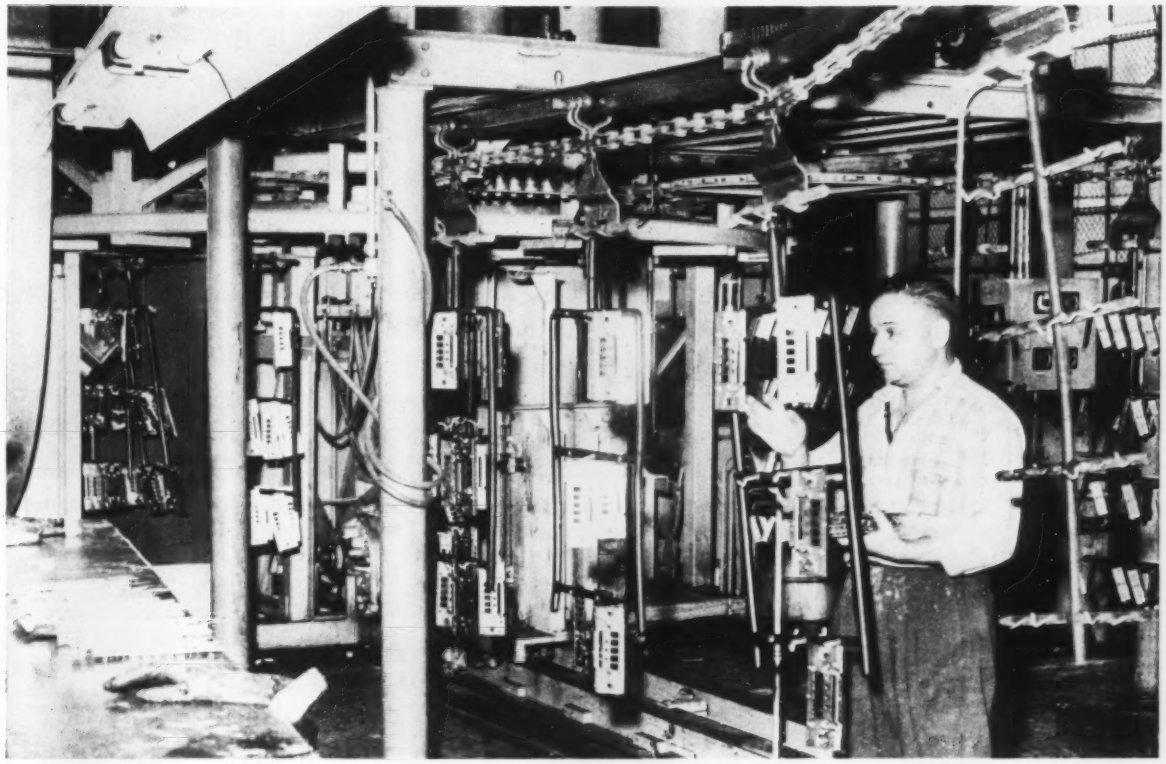
Effect of Design—With proper design, even low alloy materials can withstand the high temperatures encountered for short times. This was shown by the Germans on their V-2 missile which used ordinary hot-rolled 1010 steel in the combustion chamber where the temperature reached 4000° F. This was done by putting fuel under pressure and flow through the double liner of this tank and also injecting alcohol through small holes in the inner liner.

Generally, missile construction will follow pressure vessel methods. Honeycomb is promising because of its lightness, high strength and rigidity. The metallurgist will have to develop new brazing and welding techniques to obtain strong connections under severe thermal expansion conditions. Volume availability of consistently high quality materials must be assured. The alloys will have to meet thickness tolerances and special flatness requirements, have no measurable decarb, pass ultrasonic and magnaflux testing and have guaranteed mechanical properties.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, O.*

Thermal Properties of High Temperature Materials

	Temperature range from 70°F to	Coeff. of Thermal Expansion per °F x 10^{-6}
METALS		
Molybdenum	3250	3.8
Tungsten	5400	3.7
Chromium	1300	5.2
Type 410	900	6.6
Iron	1450	8.1
Nickel	1650	9.0
Inconel-X	1600	9.2
X-40	1500	9.2
Type 321	1450	10.5
Type 304	1650	10.7
CERAMICS		
3 Al_2O_3—2 SiO_2	1450	3.1
Tungsten Carbide	1450	3.5
Zirconia	1450	3.6
Titanium Carbide	1450	4.2
Alumina	1450	4.5
Magnesia	1450	7.5



Cadmium plated radio and TV parts are unloaded at Motorola Inc.

Production Line Plating

There is a trend to small, automatic machines that can be tied directly into the line. They speed output of parts, cut down on handling time

SMALL PLATING machines are getting a play at Ford Motor Co., Motorola Inc. and General Motor's Saginaw Steering Gear Division.

Large automatic plating lines have proved successful for auto manufacturers, farm equipment suppliers and other industries. But of late there has been a trend toward a compact automatic unit which can handle a variety of small parts.

Ford Setup—Two plating machines made by Wagner Bros. Inc., Detroit, went to Ford's Rawsonville, Mich., plant. One is used for dichromate treatment of carburetor parts. The other does chemical processing on die-cast aluminum parts for auto booster pumps. A third one is being installed in Ford's small parts plant, Indianapolis. It will copper plate sector shafts for steering gears.

Although these units are not in full operation, here's what Ford expects from them:

The dichromate plating line at Rawsonville has a rated output of 40 baskets of parts an hour. Estimated weight per rack is 150 lb. There are ten stations in the line. Total cycle time is estimated at slightly under 20 minutes. Tank size at each station is about 32 in. long, 40 in. wide and 30 in. deep. There are 20 carriers on the line.

Copper Plate—The plating line at Indianapolis will handle 56 racks, or 4536 pieces an hour. Estimated weight per rack is 90 lb. There are 12 stations and 51 carriers. Total cycle time will run close to 47 minutes.

O. Henry Tiedeman, general manager of equipment for Wagner Bros., explains the big difference between these and other small plating units: "Our machines are automatically loaded and unloaded from conveyors. That way, they can be tied into a production line or operated separately."

Motorola's Unit — Probably the best example of how the system works comes from Motorola. Ray Gould, superintendent of the Chi-

cago firm's manufacturing division, reports the plating machine has been in full production since October, 1956. It cadmium plates parts ranging from a 14 x 4 x 4 in. TV chassis to discs 1 in. in diameter. Parts are made of cold-rolled sheets. The cadmium plate is 0.0003 in. thick.

Mr. Gould says his company expects to save 30 to 35 per cent of the cost of having the plating done outside. Savings the first year should equal the cost of the equipment, he believes.

Operation—The plating line is U-shaped and has 17 stations. In front of the line is an oval monorail loading and unloading area. Motorola does not tie the plating unit into the rest of its assembly system. Parts are brought in on pallets or in cartons.

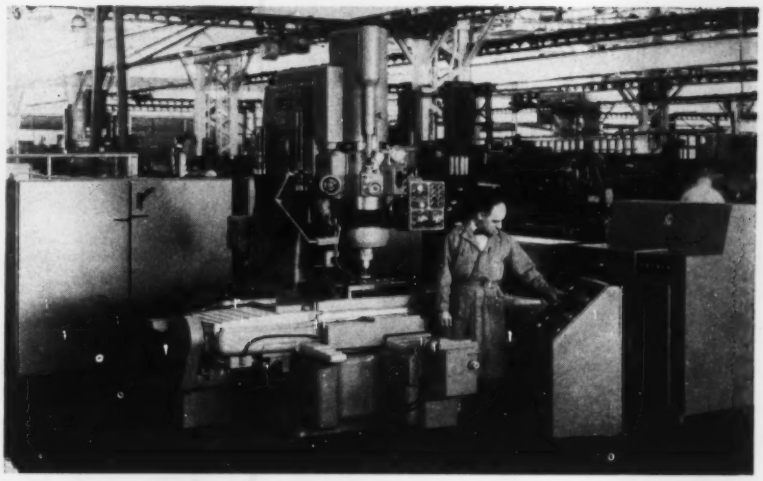
Depending on the size of the parts, one or two men load the plating racks. A hydraulic setup moves loaded racks from the oval conveyor to the plating line conveyor. Hydraulically operated actuators also move sections of the plating conveyor up and down as the racks move from one tank to the next.

Return—At the end of the plating cycle, parts automatically are returned to the loading and unloading area where an operator removes them and places them back in containers to be trundled off to final assembly.

Mr. Gould points out that part design is important in this type automatic operation. Designers must provide a hole or some other method in each part so it can be racked for plating. Another caution: Racks must be separated so the liquid in each tank can drain from the racks before they move on to the next station. Carry-out of fluid will cause contamination.

Variations — More emphasis is put on automation at GM's Saginaw Steering Gear Division, Saginaw, Mich. Parts are automatically placed on plating racks by a walking beam. This makes it easier to move them from plating to assembly lines.

Mr. Tiedeman adds that the Motorola machine is built in two sections. This makes for simplified packaging and shipping. It means the units can be set up in a few days instead of several weeks.



Numerically controlled vertical hole grinder. Units are: Control cabinet (left), hole grinder (center), control panel and tape cabinet (right)

Grinders Controlled by Tape

First units of a new numerical control system will be used for aircraft jet engine production. The system also can be used on jig borers and rotary tables

TAKE a precision toolroom machine like a vertical hole grinder, install a numerical control system, and it's an efficient production unit.

The first machine of this type has been shipped to Ford's Aircraft Engine Division, Chicago. Two other large numerically controlled machines are scheduled for early delivery to the Pratt & Whitney Aircraft Division of United Aircraft Corp., East Hartford, Conn.

Accuracy — Built by Pratt & Whitney Co. Inc., subsidiary of Penn-Texas Corp., West Hartford, Conn., the control system makes possible automatic positioning within 0.0001 in.

Numerical control also has been applied to the company's line of jig borers and rotary tables. All blueprint data needed for locating, indexing, boring and grinding are stored on punched tape and translated into mechanical action by the machines.

Among the many advantages of automatic programming via numerical control (see STEEL, Jan. 21, p. 68) are the elimination of human error in reading or setting dials or verniers, ability to rapidly set all slides and verniers simultaneously, increased operating speeds and efficiency, constant precision, minimum setup time and faster cycle times.

Operator changes roll of tape on which digital information has been punched. It controls tool position

Today's lightweight portable grinders need this kind of wheel!

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"X-ray" view of wheel shows pronged anchor bushing and safety ring.

Here a worker uses a lightweight grinder with a U. S. Royalite Hard Shell Cup Wheel, to remove weld butt and to clean up welded structural steel member.

Removing weld flash from fabricated steel component for atomic reactor. Careful dressing of weld flash was required to obtain smooth surface for joining with other components.

Contour grinding (to template) for smooth surface joint between components for atomic reactor. Component is of fabricated steel.

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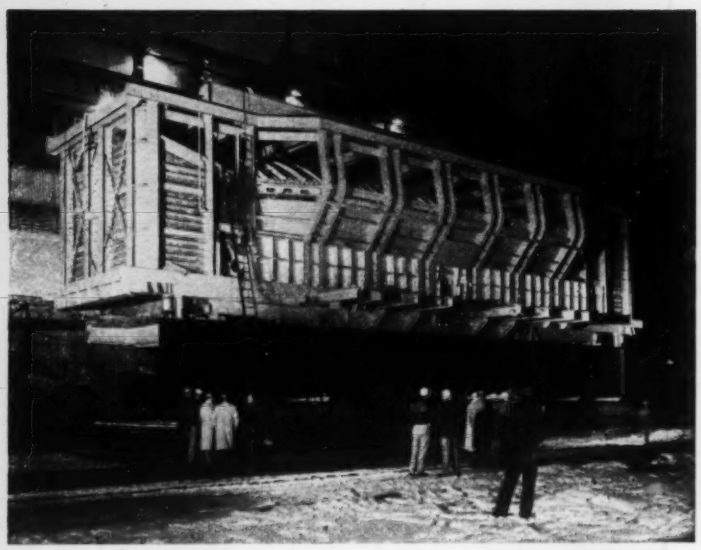
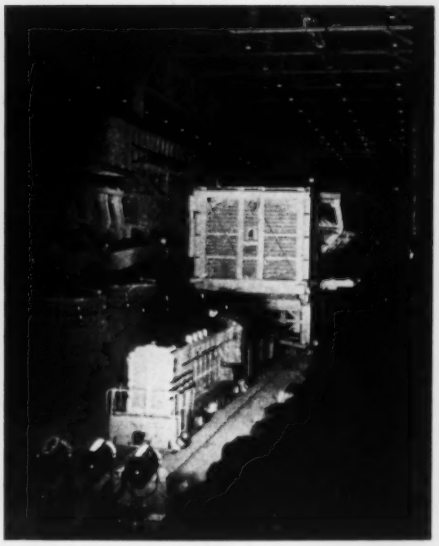


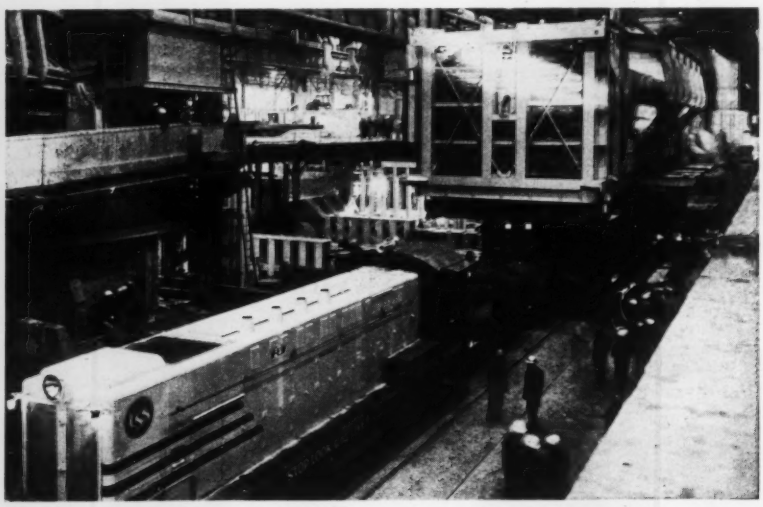
A complete open hearth furnace—1850 tons of brick and steel—stands outside the open hearth building at U.S. Steel's Geneva Works



Under klieg lights, the furnace moves slowly into the shop on its ingot buggy carriage

Prefabricated Open Hearths

They're a phenomenal saver of down time in U.S. Steel's program to boost steelmaking capacity at Geneva Works from 1,879,000 to 2,262,000 ingot tons yearly



A hole, 100 ft across, stands ready to receive the furnace which has reached the transfer point. Here it will be slid sideways into position

AN unconventional idea is paying big dividends at the Geneva Works of U.S. Steel Corp., Provo, Utah. Open hearths are being prefabricated at a saving of as much as 21 days in furnace replacement time.

The process involved the building of complete furnace frameworks outside the open hearth shop, then moving them into place as a complete package. Seven of ten Geneva open hearths were rebuilt and enlarged to 300-ton capacity in this fashion. On an eighth, even the brickwork was installed before it was moved. Two furnaces, rebuilt in conventional fashion earlier, made good controls for the project.

Speedy Six—No. 6, all 1850 tons of it complete with 33 carloads of refractory bricks, was moved endwise 900 ft in 78 minutes, then rolled sidewise into place. Down time from old to new was 11 days.

To make the move simple, the furnace was constructed on six ingot mold cars mounted on three

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sets of tracks. An erection platform of special beams was built on the cars at right angles to the track. Roller assemblies were installed on top of the beams, and rigid base plates were mounted on the rollers to receive the furnace frame.

No Skew — Steelwork was designed to provide support for the cantilever load (including brickwork) without deflection. Tierod bracing on the ends of the roof and on the furnace sides prevented sway. Heaters, installed in the furnace during fabrication, protected the refractories from freezing weather.

Three sets of tracks extended from the erection site 900 ft along the open hearth pit to the furnace location. Approximately 3 ft of dolomite fill under the tracks provided uniform bearing area for the ties, and at the crosstransfer site, a reinforced concrete pad approximately 4 ft thick was poured to support the load.

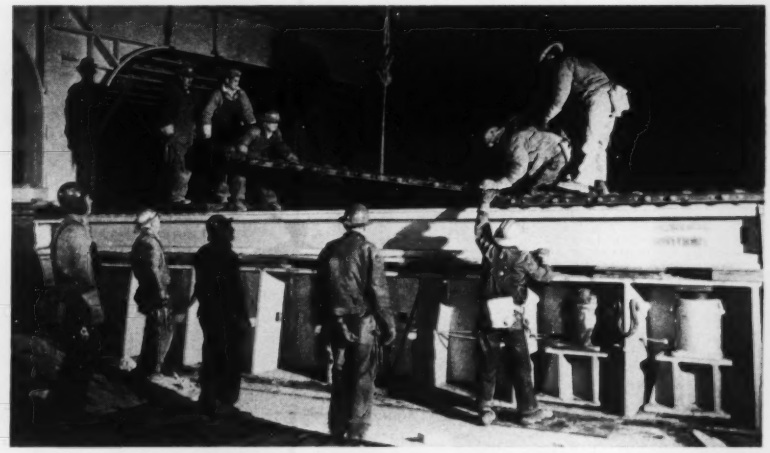
Into Place—Two structural steel transfer bridges were fabricated to carry the furnace across the transfer site from the tracks to the foundation columns. Smooth plates capped the bridges to support the rollers.

One of Geneva's 120-ton diesel switch engines, coupled through two mold transfer cars to the middle mold car bearing the furnace, pulled the package to the transfer site. Couplings were blocked in extended position to prevent slack. A rheostat control on the engine assured smooth movement at extremely slow speed.

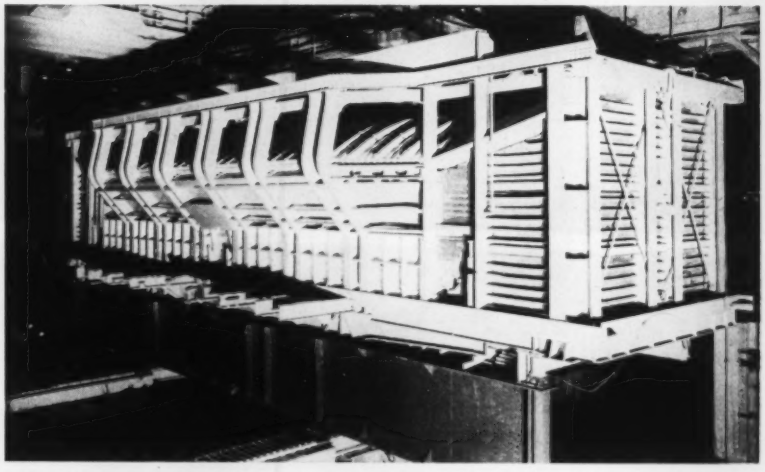
Slow Roll—A double drum hoisting engine driving through a torque converter pulled the furnace into place, with cables reeved to give a 12-part line. A four-part line was used as a brake.

Crosstransfer was done at 1 fpm without incident. (It took about 20 minutes.) The furnace was then welded into place on the end columns. The final phase consisted of tying into piping and electrical lines and sealing the slag pockets and checker chambers.

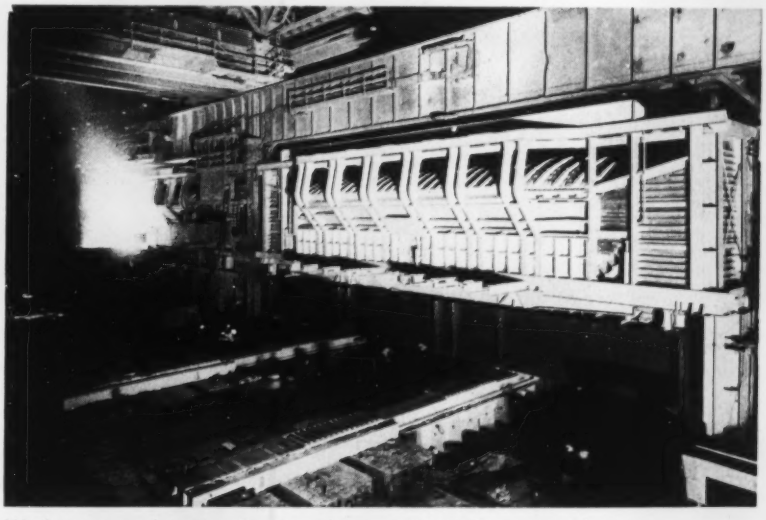
The furnaces are the first phase of a program to increase steelmaking capacity at the Geneva Works by 20 per cent. By late 1957 it is expected to reach 2,262,000 annual ingot tons.



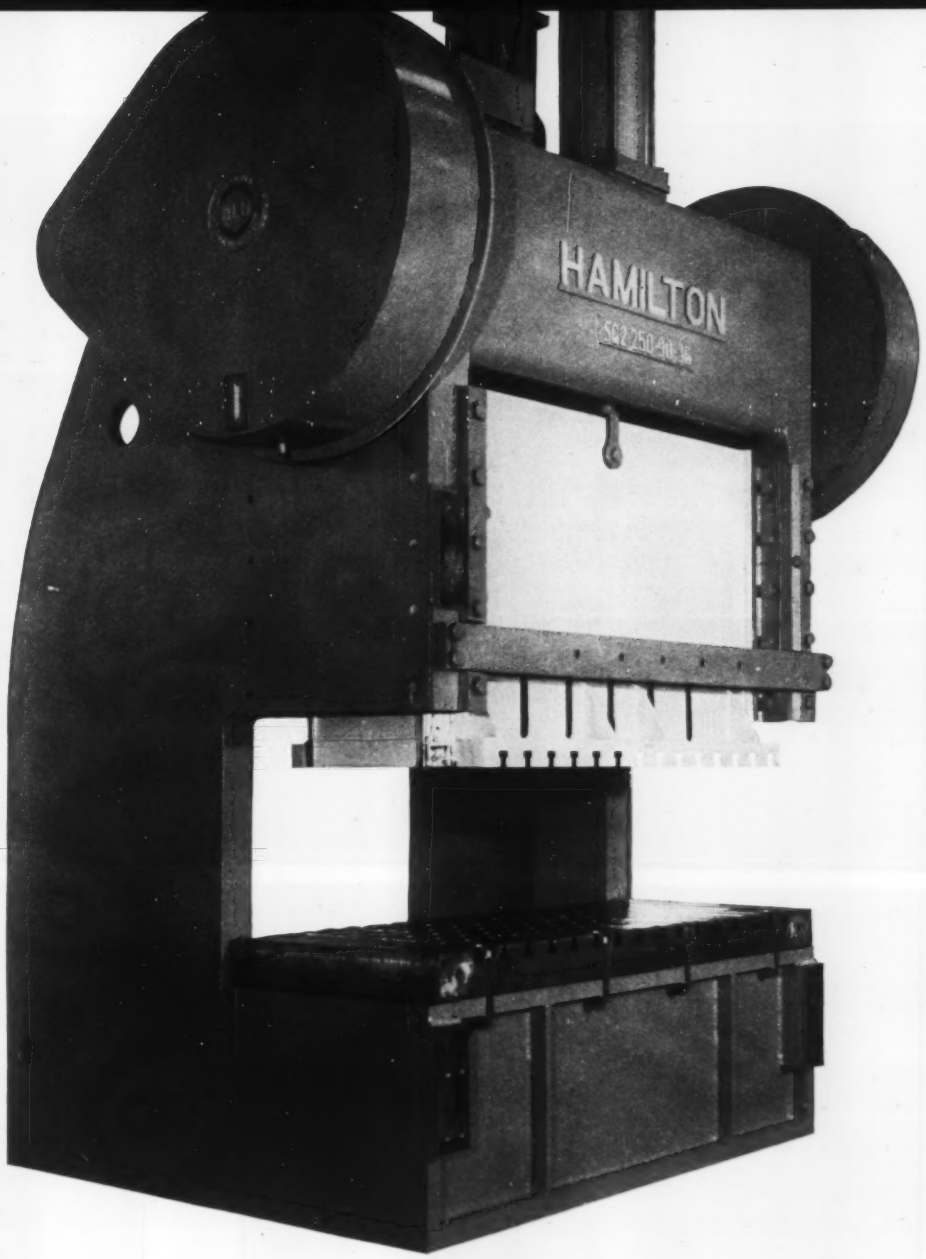
Workmen place rollers on the structural steel bridges on which the furnace will be slid into its berth. Transfer took less than 30 minutes



Inched forward by heavy cables, the furnace has left the ingot buggy carriage and is more than halfway across the transfer bridges



Workmen complete the final touches on No. 6 furnace. Change-over, using prefabricating techniques, took only 11 days, a record



Hamilton press line expanded to include medium size presses

Pictured above is a new Hamilton Gap Press recently installed at the Eaton Manufacturing Company, Cleveland, Ohio. This new large-bed press stamps out the larger grille guards which the latest model cars are calling for.

The capacity of this press is 250 tons and the speed 28 to 30 strokes per minute. Bed area is 90 in. right to left; 36 in. front to back. It is one of a new line of single and double-crank presses ranging from 100-300 tons capacity.

Write to Hamilton Division, B-L-H Corporation, for full information and specifications on this new line of heavy duty Hamilton presses.

Hamilton Division Hamilton, Ohio

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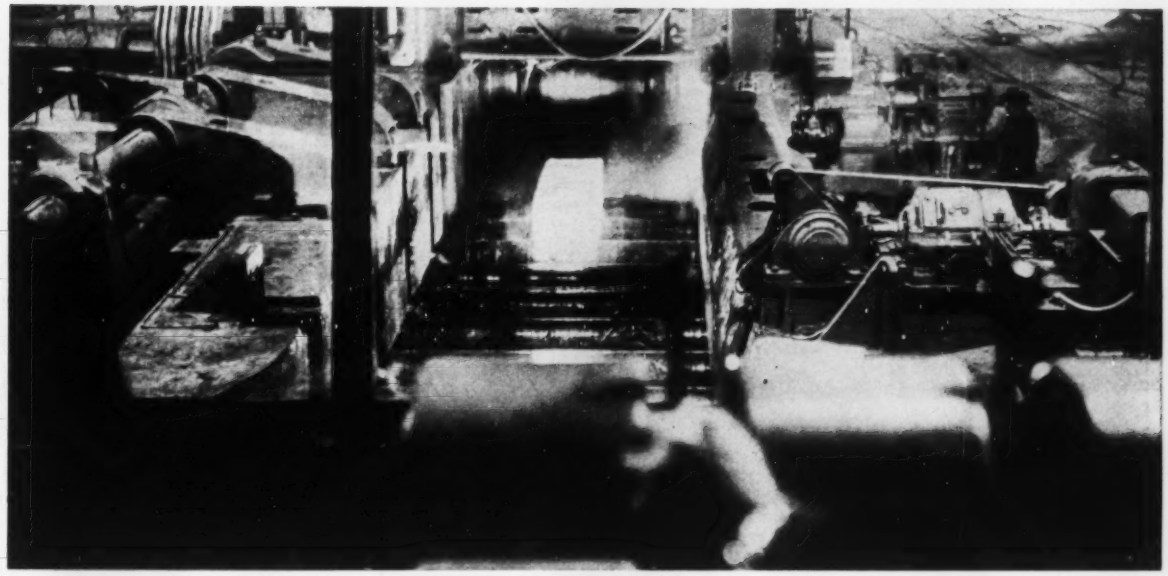


Seen from the pulpit, a hot ingot starts through on a trial run of Sharon Steel's new blooming and slabbing mill

Mill Unlocks a Bigger Market

With the christening of a 44-in. blooming and slabbing mill at Sharon Steel's Roemer Works, the door to a broader product base begins to open

ON FEB. 8, Sharon Steel Corp. entered a new era. The event was celebrated by the rolling of a ceremonial ingot on Sharon's new 44-in. slabbing and blooming mill in Farrell, Pa.

For the Roemer Works, the mill represents only the beginning of a modernization and expansion program. For the corporation as a whole, it opens expectations of a larger market in stainless steel, wider strip and bigger plates. The competitive picture looks suddenly brighter (Sharon has been hemmed in by the limitations of its narrow mills).

Design—Appropriately, the mill itself represents the start of a new era in design. A year before it was built, Sharon had General Electric Co. make a simulated study of the entire rolling operation. Data such as weight of ingots, their speed of travel and characteristics of mill motors were fed into an analog computer. The study helped establish the best design. Characteristics of the mill were known before a roll turned. Sharon figures the method saved months of field testing and adjustment.

The mill is a $14-million investment housed in a new 150 x 650 ft building. Included are six soaking pits, two cranes, the mill and its drives, a hot scarfing machine, a cropping shear and transfer buggies, tables and beds.

Characteristics — Main rolls of the mill are 46 in. in diameter. Maximum roll opening is 70 in. The mill can handle ingots up to 20 tons and produce slabs 10 x 60 in. which are 30 ft long.

It's driven by twin 4000-hp motors that reverse in 1¼-seconds.

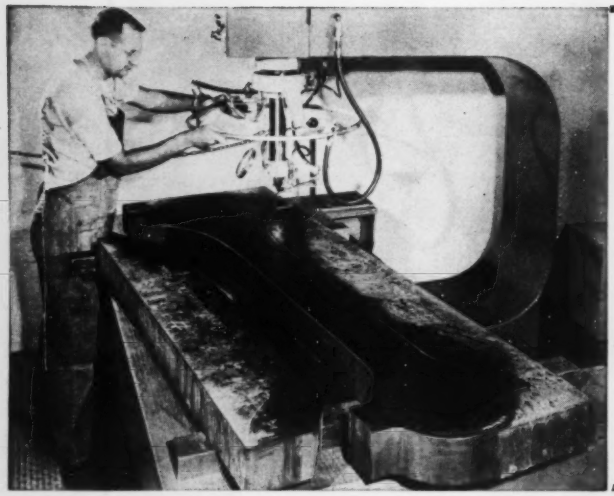
The hot scarfer, using oxyacetllene jets, descales and cleans up skin defects on all four sides of a bloom or slab in one pass. Crop shears can handle a 7 x 60 in. slab or a 16 x 20 in. bloom.

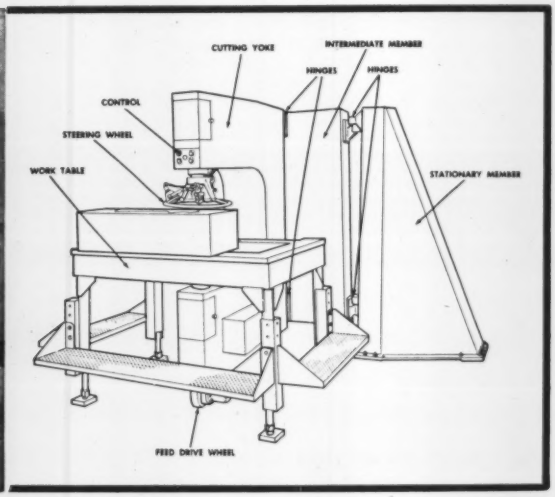
Capacity—The mill is rated at 1.2 million tons capacity. It replaces an antique steam driven bloomer, which will probably go on stand-by soon. Soaking pits for the old mill are being enlarged. They will feed ingots into the new mill on an ingot buggy which delivers them directly to the entry table rolls just ahead of the new soaking pits.

The mill is set to handle ingots from three open hearths (they were recently enlarged to 250 tons capacity each) and stainless ingots from electric furnaces at Lowellville, O. Ground has been broken at the Roemer Works for a 100-ton electric furnace to increase the company's output of stainless and high alloy steel. By year end, when the electric furnace goes into operation, Sharon's ingot capacity will exceed 2 million tons.

Wider — Full potential of the blooming mill will not be realized until the company installs a wider hot strip mill. There's ample room for it, and more finishing mills, directly off the exit end of the blooming mill. Until these are built, slabs will move sideways on a slab conveyor into the adjacent hot rolling facilities.

The program is geared to breaking first bottlenecks first. Although no timetable has been announced for wider finishing mills, company officials say the move is obvious in the light of Sharon's competitive position.





Guiding the blade through a contoured cut, the operator turns a handwheel that also turns the feed wheel on the floor (see drawing at right). The wheel drives the saw at a predetermined feed rate set with a rheostat

Saw Cuts Stationary Work

Swinging on a double-hinged extension, this contour saw has a work area of 70 sq ft. Its feed comes through a rubber-tired wheel that drives on the floor

IF YOU want to machine a workpiece that's heavy, ungainly or unbalanced, it may be easier to move the tool than to move the work. That is the premise engineers at DoAll Co., Des Plaines, Ill., used when they developed the model 5 contour sawing machine.

With the business end of the machine double-hinged, the saw has a work area of 70 sq ft. It can take a straight cut 14½-ft long. Engineers call it "articulated construction." The cutting and guiding mechanism is carried by a yoke made of aluminum. Both the yoke and an intermediate member are mounted on antifriction bearing hinges.

Guided—The yoke houses a complete four wheel, variable speed band machine. Upper and lower blade guides are mounted on tubular posts through which the blade travels. Both posts telescope to adjust for work thickness.

The posts and the power feed wheel are connected to a countershaft through sprockets and chains. Any movement of the top post is transmitted to the bottom post and to the feed wheel.

Drive—The handwheel connected to the top post permits the operator to twist the blade 180 degrees in either direction. The handwheel turns the lower feed wheel at the same time the blade is turned.

The rubber-tired feed wheel is driven by a torque motor. It moves the entire yoke in the direction the blade is pointed. Force of the feed can be controlled through a rheostat. The wheel also can be lifted so the cutting head can be swung freely.

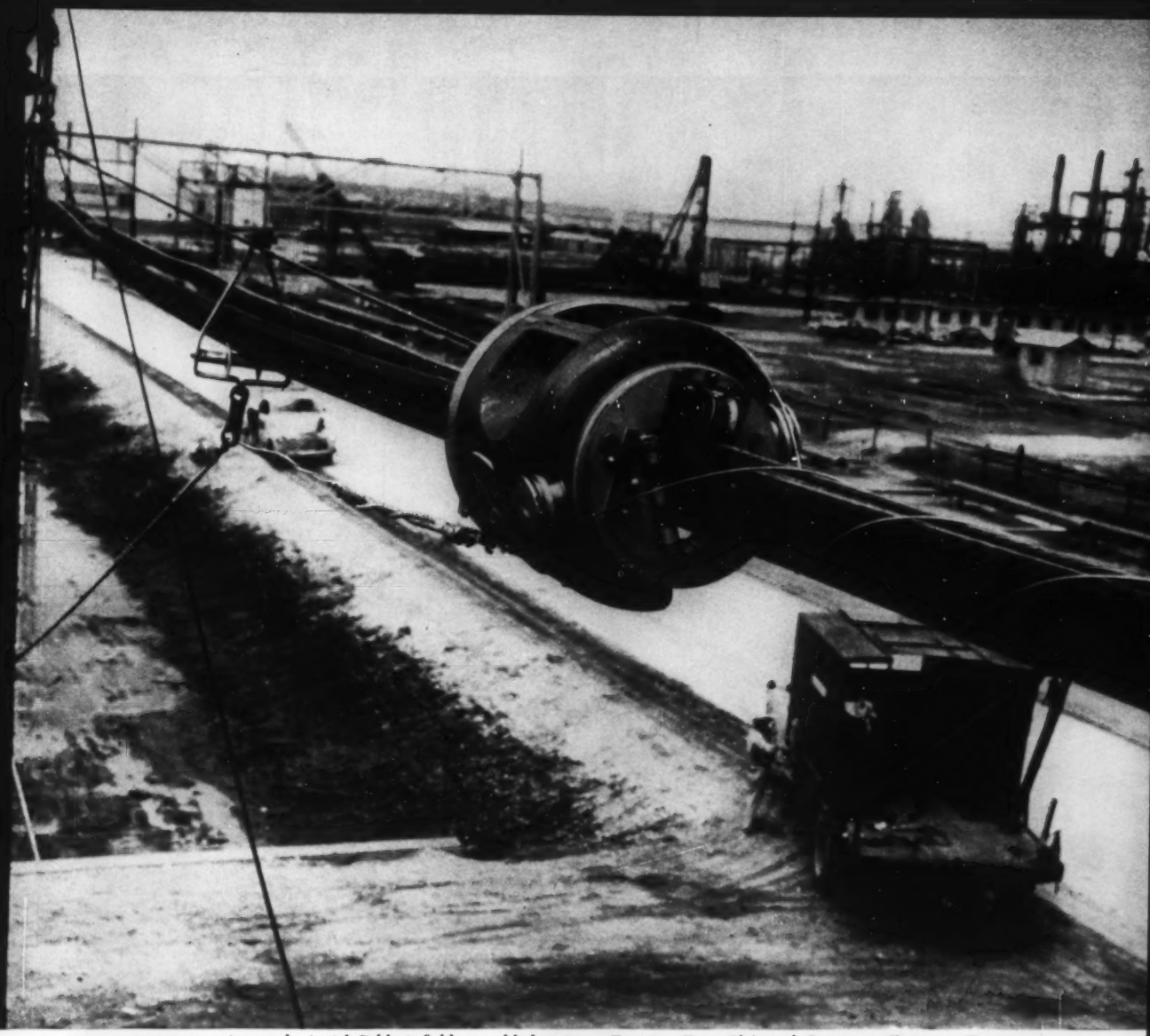
Offspring — This isn't the first hinged-member machine to come out of the DoAll plant. Several years ago, the engineers pondered problems involved in making huge dies for the widely publicized Air Force heavy presses. They developed a conventional sawing machine, so large that the operator had to follow his work through an optical system.

To keep this costly machine going full time, engineers worked out a die filing machine to work as a companion. The die filer took the new approach: Let the work sit still while the machine moves.

Question — Comparing the two machines, the obvious question came up. If the smaller, simpler, much less expensive die filer could perform delicate finish filing, why couldn't it be modified to perform as a saw?

Because of ever increasing demand for big contour machines, the engineers started a development program to get the answer. The model 5 is the result.

Market—DoAll executives think the new machine will find wide applications in the airframe and shipbuilding industries where machining of large, intricate contours is commonplace. They admit, however, that the work for which it's most suited is machining of large dies. That's what it was designed for.



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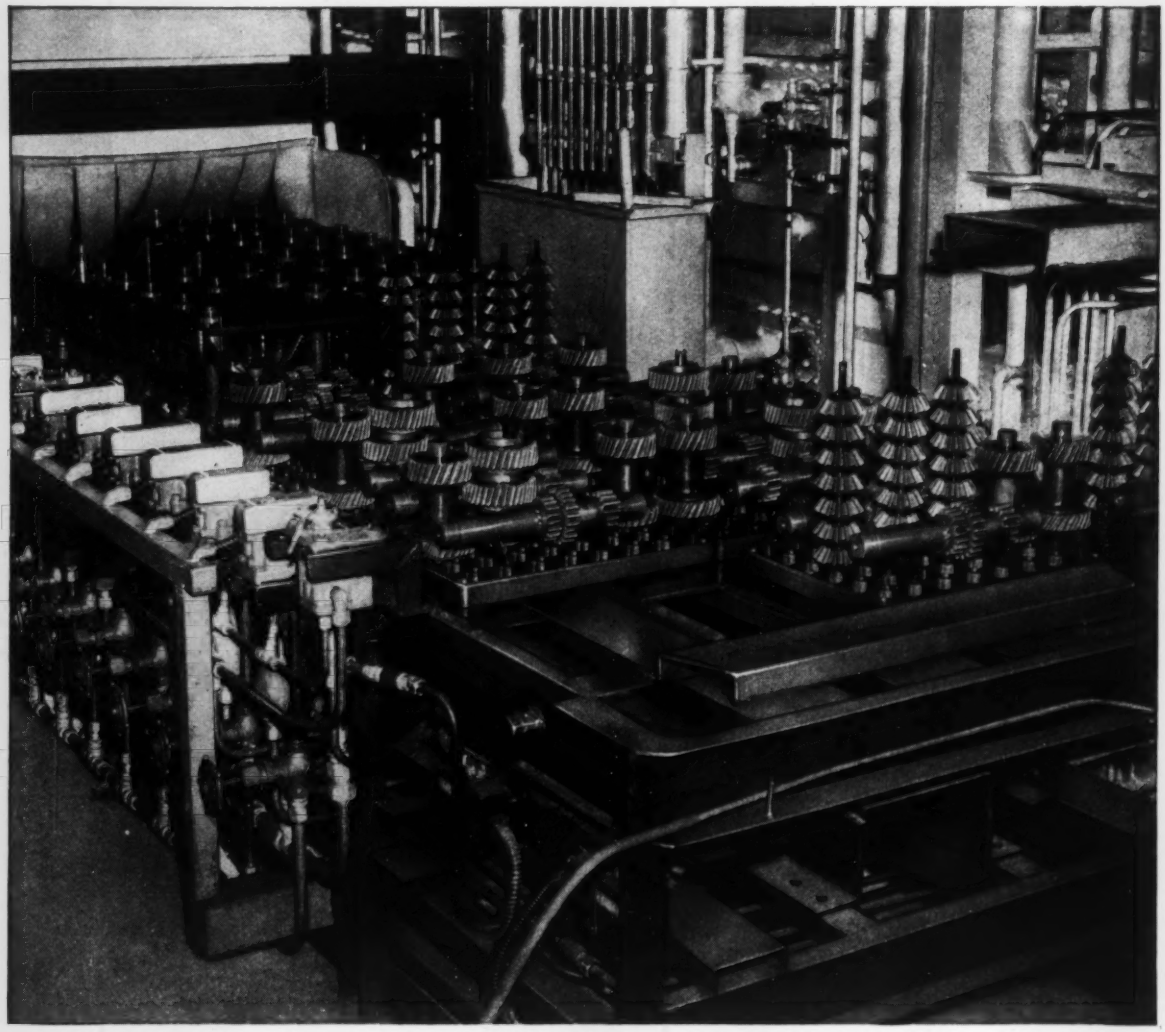

Surface zoned gas carburizing toughens gears, cuts steel costs

The manufacturer of these heavy duty truck gears improved metallurgical properties and reduced material and labor costs when he adopted Surface zoned gas carburizing. Unique atmosphere manifolding enables him to limit surface carbon content (.80% max.), get sufficient case depth, and still maintain good carburizing rates (530-900 net lbs./hr.). With the quality of Surface carburizing, he could use steels lower in alloy content.

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Surface
HEAT TREATING EQUIPMENT

Where Expansion Should Start

The first question to ask, advises this builder, is whether you can increase capacity by updating equipment. You may avoid a costly building job, accomplish same results

PLANT EXPANSION ought to be the second consideration, not the first, when you make plans to increase capacity.

Says Richard W. Banfield, president, Motch & Merryweather Machinery Co., Cleveland: "When business steps up, the immediate temptation is expand the plant. But is this necessary? Building costs a lot of money. Are a large number of the machines in the present plant ten years old or older? Time and again, you'll find that one new machine can do the work being done by three old ones. In short, the problem of plant space may be solved by a program of equipment modernization which should be undertaken anyhow."

Reverse — Builders continue to hammer at creeping obsolescence. Most plants are still losing ground to obsolescence, even when the host of recently acquired "expansion equipment" is counted in. An obvious reason: It's hard to replace a machine that's still cutting metal to required tolerances, particularly when it's fully written off the books.

Why purchase and install new equipment when you have machines that can do the work?

Mr. Banfield's answer: "The new one cuts metal better, faster, cheaper, more accurately. The whole object of developing that new model was to reduce production costs. That's why I say that although production men call a machine tool a metalcutting machine, it really ought to be called a cost-cutting machine because that's what it is for."

A Special Standard

When the engineers at Landis Machine Co., Waynesboro, Pa., went to work on designs for their Lanhyrol thread rolling machine, they undoubtedly figured it would do more than just roll standard thread forms. It's unlikely, though, that they expected the standard forms to be in a minority—but after two years of experience, that has proved to be the case.

Edward C. Hanna, research engineer, says: "we've done more worm and specials than we have standard thread forms."

Probable reason: At the time the machine was introduced (STEEL, Apr. 25, 1955, p. 100), rolling of standard threads was well accepted. Thus Landis has received a full portion of problem jobs.

Here are some the machine has done:

- Leadscrew for a dictating machine record cutting stylus—$\frac{3}{8}$-in. diameter, 33$\frac{1}{3}$-threads per inch, 29 degree Acme thread form. Production: ten parts a minute.
- Engine block stud — $\frac{5}{8}$-11 threads, 2$\frac{3}{4}$-in. long, class 3 on one end, class 5 on the other. Production: Both threads in one pass, 80 parts a minute from automatic, hopper-fed machine.
- Double-end U-bolt — 5/16-24 thread, 4$\frac{1}{4}$-in. long slug. After threading parts are heat treated, coined and bent into U-shape. Production on the thread roller: 132 parts a minute.
- Screw for trailer parking jack—$\frac{3}{4}$-6 thread, 29 degree Acme form, rolled in C1117 cold drawn bars, 20 ft long. Pitch diameter is maintained within 0.001 in. over the bar length. Die life ran over 59,000 ft. Production: 48 linear inches a minute.
- Armature shaft for vacuum sweeper—5/16-24 thread rolled over a 3/16-in. hexagon hole in one end. SAE 1144 steel is about 25 Rockwell C. Production: 60 parts a minute on automatic, hopper-fed machine.

In addition to these jobs, the engineers are optimistic about results they're getting on experiments with rolled gears, splines and machine leadscrews.

- moves *Inland Steel Products* into special production 4-times faster
- helps cut direct-labor costs 20% for *The Colorado Fuel & Iron Corp.*
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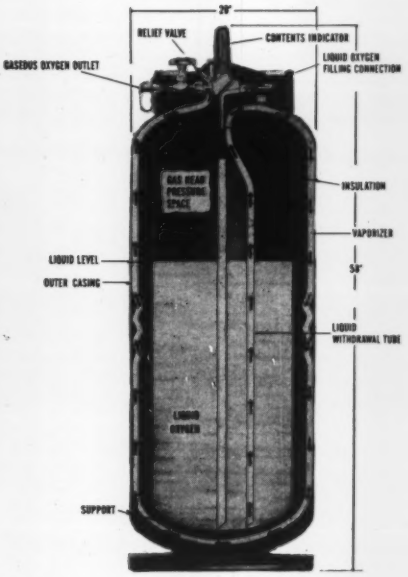
The two large cylinders are manifolded to supply the Oxweld pantograph at the right. They hold as much oxygen as 24 old-style cylinders



This is a cross section of Linde's LC-3 portable liquid oxygen container

Cylinder Stores Liquid CO_2

You can get more gas into less space if it's a liquid. This cylinder solves the problem of how to keep a liquid that boils at minus 297°F. Linde calls it the LC-3

THE two cylinders on the left in the photograph above contain 3000 cu ft of liquid oxygen each.

They aren't much bigger than the standard cylinders next to them, but they hold 12 times as much. The maker, Linde Air Products Co., New York, calls them LC-3s, and says they are simple to handle and cost no more than standard cylinders of compressed oxygen.

Size—The new cylinder can be handled by ordinary hand or lift trucks. It weighs about 250 lb empty, 500 lb full—a little more than a 55-gallon drum of water. It's 20 in. in diameter.

Linde engineers had two problems when they designed it: To keep the oxygen liquid for long periods, yet make it easy to convert into a gas. A self-contained, controlled heat transfer mechanism was the answer.

Built to withstand hard use, the LC-3 is a shell within a shell. Insulation packed between the two shells cuts down heat absorption. As it is used, the supercold gas is carried by a system of tubing between the two cylinders to further reduce heat absorption.

Economy—Linde says its new cylinder can stand untapped for 72 hours without loss. It'll stand nine days when it is full.

Liquid oxygen boils at −297°F. As soon as the maximum pressure is reached, a relief valve opens and bleeds a small amount of gas, which expands rapidly lowering the temperature and pressure. The relief valve shuts automatically. In ordinary use, there is no bleeding.

The cylinder will supply 300 cu ft of oxygen gas an hour at 75 psi. A built-in level indicates the amount of oxygen in the cylinder.

Linde says the cylinder will be of greatest benefit to firms that need 5000 cu ft and more a month.

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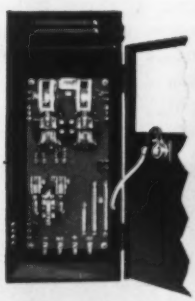
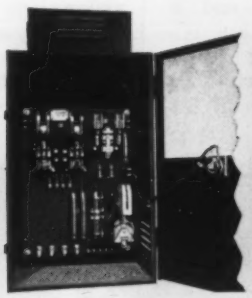
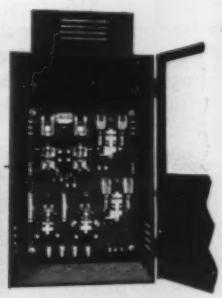


Type AD Standard Controller for single magnets or two magnets in parallel. Exclusive, adjustable discharge for different type loads



Booster Controller gives increased pull-away power from pile, then carries load at reduced current



High Speed Release DLM-335-A Controller reduces the discharge time of deep-type magnets 50%

***Bulletin 905** gives complete description of EC&M Controllers for use on lifting magnets of all types and makes*

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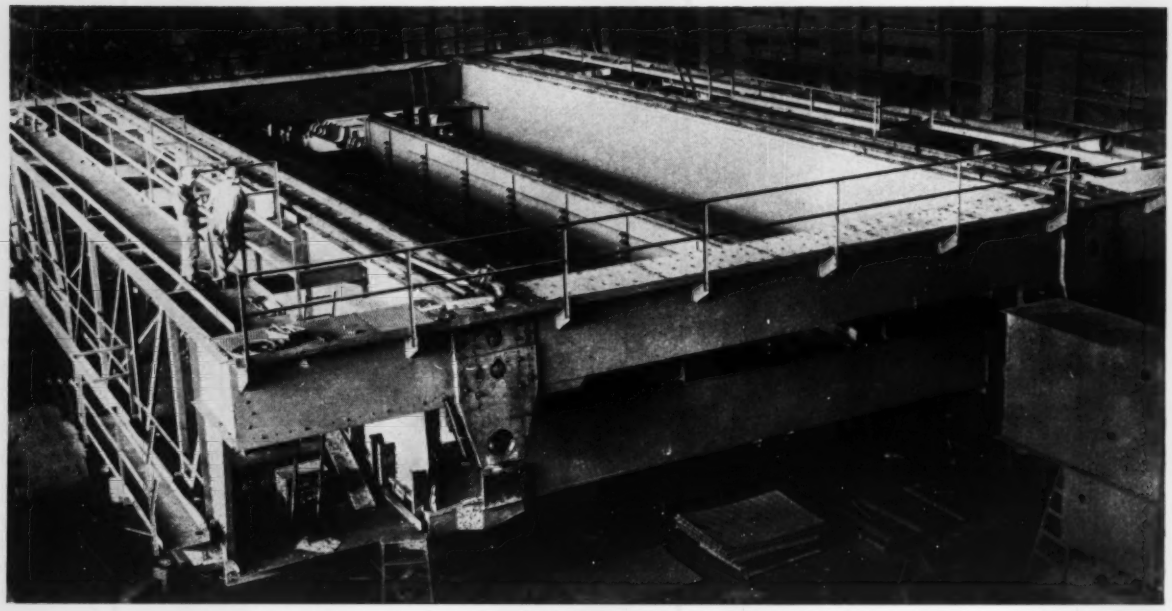

Bridge of the 500-ton ladle crane, partially assembled on the floor at Morgan Engineering Co., Alliance, O.

Lift for Giant Ladles

A LADLE crane with 500 tons of capacity is about to be shipped from Morgan Engineering Co., Alliance, O., to the Sparrows Point Works of Bethlehem Steel Co. In an industry where sheer bigness is no novelty, this is a whopping piece of equipment. The reason for it can be summed up in one short phrase: Lower handling costs.

It is the first of three cranes of the same size which Morgan is building to service the seven new Sparrows Point open hearths (modestly rated at 350 tons of capacity). These cranes can handle a furnace tap in a single ladle which is 17 ft deep by 17 ft broad.

Details — Each crane measures 82 ft in the direction of trolley travel and 68 ft in the direction of bridge travel. The bridge span, 77 ft between wheels, is made up of four welded steel girders on which ride two trolleys, also of welded construction.

The main trolley, 47 x 30 ft, weighs 640,000 lb with cables and hooks, and has a capacity of 500 tons. The small trolley for tilting empty ladles and other auxiliary jobs is rated at 75 tons. The whole package weighs about 1.84 million lb and will cost close to a dollar a pound.

Trucks—To spread the load, the bridge rides on four 4-wheel trucks with a built-in self-equalizing feature. Truck wheels can be changed by jacking the crane as little as ⅜-in. The bridge has a speed under load of 315 fpm, and is driven by four 135-hp motors.

The two main hoisting drums (87 in. in diameter) are driven by 360-hp motors. An exceptionally high safety factor was obtained by reeving the main hoisting cables in 67 parts.

Morgan has gone over almost entirely to welded crane construction. Using mechanized equipment, they make the ¾-in. fillet welds on the long girders in a single pass.

Besides the ladle cranes, Morgan is also building three 15-ton charging machines, three 35-ton soaking pit cranes, three 200-ton hot metal cranes, scrap handling cranes and other equipment for Sparrows Point.

Riveting plate sections for one of the two 250-ton ladle hooks

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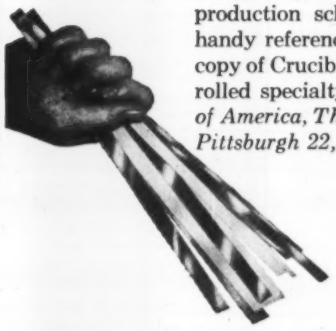

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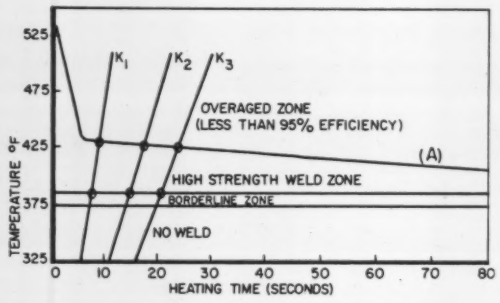
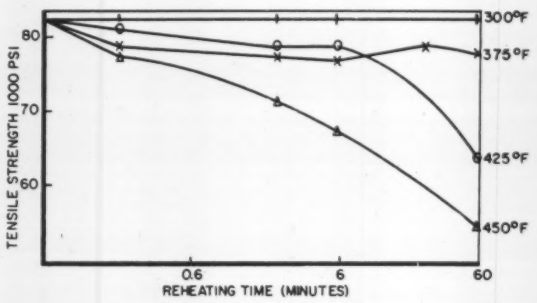




These are the approximate conditions (left) for welding 7075-T6 by the Alforge method. Metal must not be heated above line A. K_1, K_2 and K_3 are selected heating rates. The effect of heat on the tensile strength of 7075-T6 Alclad (right) shows the advantage of low-temperature, short-time welding

New Way To Weld Aluminum

Search has been for a joint which is as strong as the parent metal and is 100 per cent efficient. Here is a report on a method that shows some promise of achieving those twin goals

THE rapid growth of aluminum owes much to improved welding methods.

The latest is Alforge. It resembles buttwelding, although parts are heated by a flame and temperatures are relatively low (350 to 500°F).

Here are some of its advantages: Welds are completed in a few seconds; weld metal is ductile and in the wrought condition; joints are almost 100 per cent efficient.

The inventors are L. A. Cook and Donald G. Shafer, Ravens-Metal Products Inc., Ravenswood, W. Va.

Weld Metal—Most welding methods use a lot of heat. Weld metal deposits tend to be weaker and more brittle than base metal.

With some alloys, the metal at the edges of the heat-affected zone is partially annealed or overaged, conditions which destroy good metallurgical properties.

Way Out—One answer to the problem is to apply less heat. Cold pressure welding is one way, but its applications are limited.

Alforge offers close control of the heat-pressure-time cycle. These simple steps are involved.

1. Prepare mating surfaces by light filing, degreasing and wire brushing.

2. Place parts in a die, applying a light pressure. The amount of forging (related to weld quality) is determined by the amount of material projecting from die face.

3. Heat the ends of the parts to be joined. (This takes less than half a minute.)

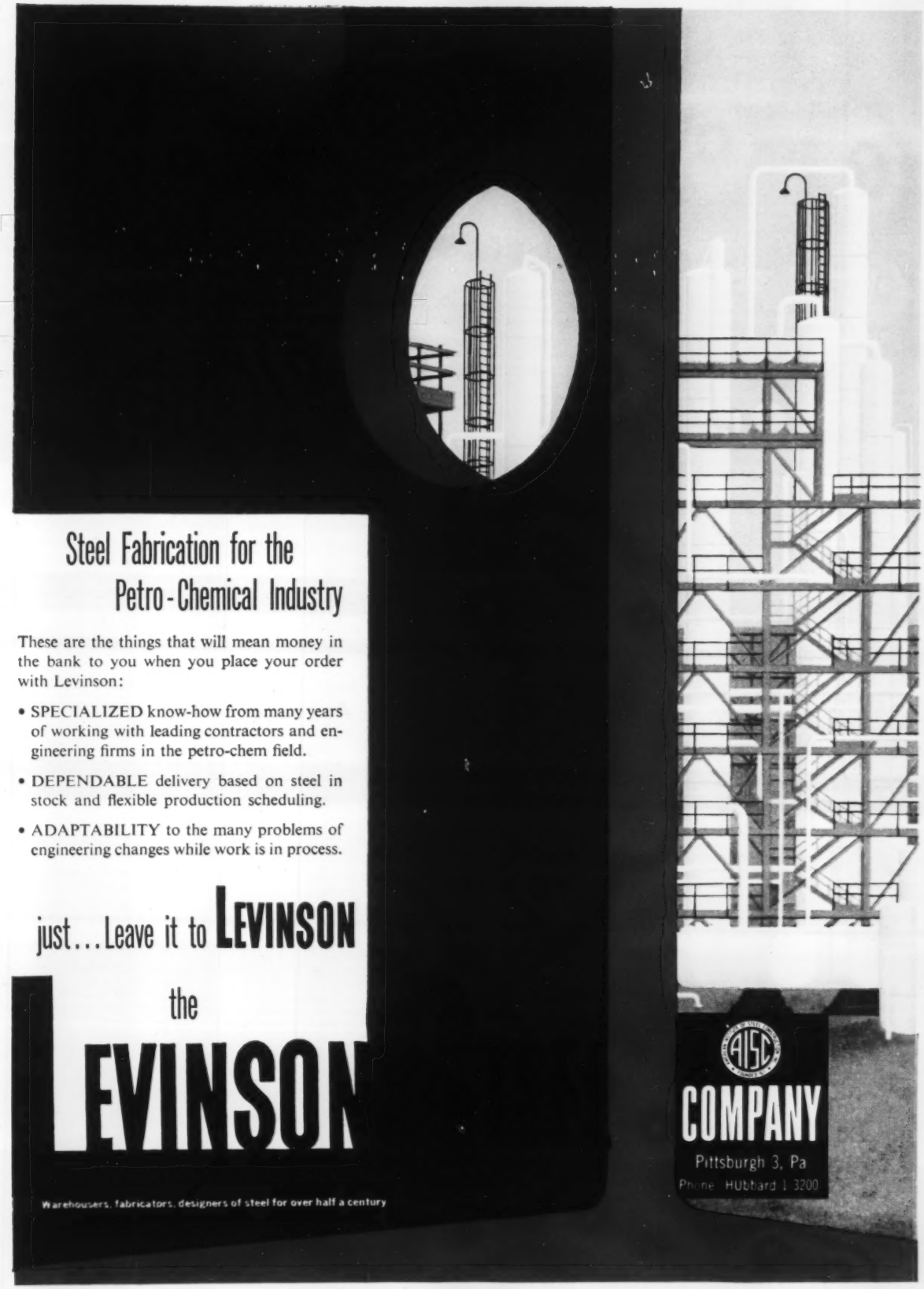
4. Apply final forging pressure (about 150 tons psi) so that the heated ends flow uniformly from the interface. This creates a flash and completes the weld.

5. Remove parts, cool and trim flash.

Such welds have much less notch effect than is found in most conventional welds. There are no inclusions or porosity. Surveys across the weld show only a slight drop in hardness, a fact which can be partly attributed to grain direction.

Early Stages—It's a little early to tell how much Alforge can do.

(*Please turn to page* 111)



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"Dave, that Dow Methylene Chloride sure cured our stripping problems with masking lacquer"

"It sure did, Jess. It takes minutes to do jobs that other cleaning and stripping compounds take *hours* to do."

"Wonder why?"

"Two reasons. One is high solvent power. Dow Methylene Chloride penetrates coatings faster. The other is that it immediately starts an evenly distributed lifting action that really loosens things up."

"Would it strip those new parts we got in last week?"

"Probably would. They use Dow Methylene Chloride for all sorts of formulations to strip paint, varnish, lacquers and epoxy resins. Good vapor degreasant, too. Sometimes it's possible to use methylene chloride in a common vapor degreaser."

"Is it safe, Dave?"

"It's nonflammable and carries a low toxicity rating—the MAC is 500 ppm. Very stable, too!"

"Sounds better all the time. Tell me more."

"That's all I know, but the Dow people can answer all your questions. Why don't you write them a note?"

"Who?"

"You know, they make Dow Perchloroethylene Industrial and Dow Trichloroethylene for vapor degreasing, and Chlorothene® for cold cleaning. THE DOW CHEMICAL COMPANY, Midland, Michigan."

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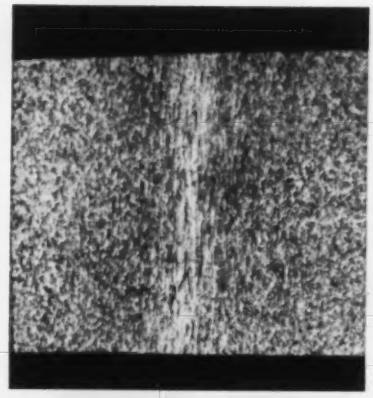
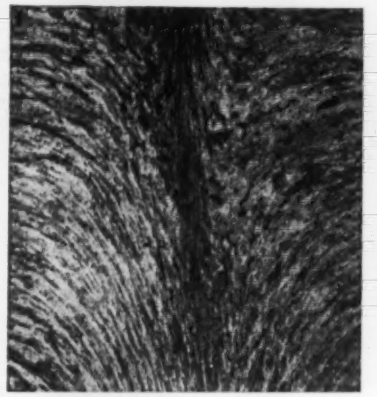
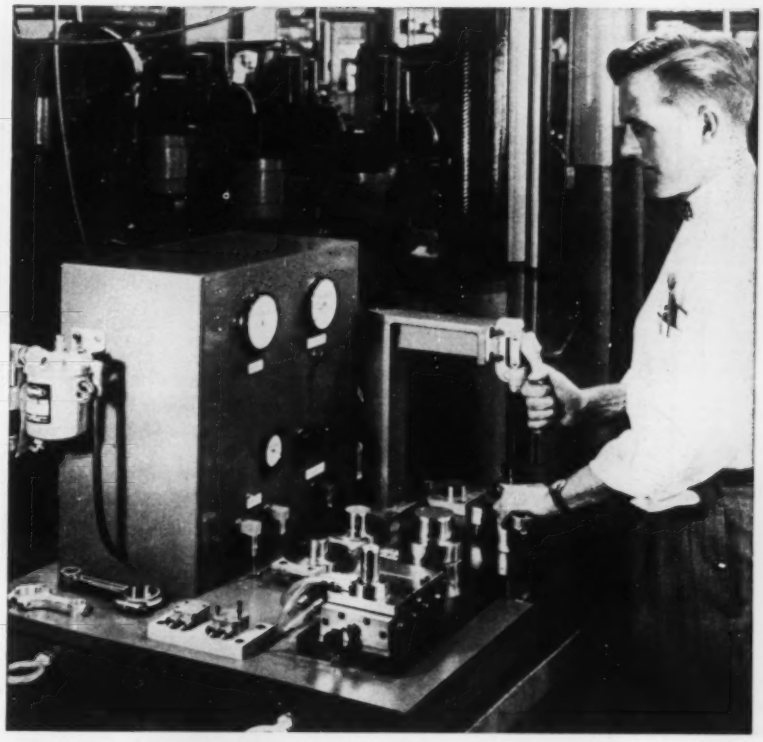




These photomicrographs are a cross section through (above) and a section across the face of a weld made in 7075 aluminum



Measuring squareness of crankshaft bore to connecting rod face

Three Sizes with One Gage

WELD ALUMINUM . . .

The high strength, heat-treatable alloys like 7075-T6, 2024-T36, 2017-T4, and 2014-T6 respond well. Ravens-Metal is joining magnesium and its alloys with some success. There's a probability that it will work for other nonferrous metals like zirconium, titanium and molybdenum.

Alforge joins dissimilar metals, too. Kaiser Aluminum & Chemical Corp., Spokane, welds its type 336.4 MCM electrical connectors with this method. One end of the connector is copper, the other aluminum. The part has excellent mechanical and electrical properties and resists corrosion at the interface.

Other developments you can look for include all-aluminum chains and truck wheel rims.

Equipment cost is reasonable (around $25,000 for parts with a 3½-in. cross-sectional area). The process is patented.

GAGE flexibility and simplified design are important to users. They affect operating as well as initial equipment costs.

The two-station gage Carrier Corp., Syracuse, N. Y., uses to check three sizes of connecting rods illustrates the point. It measures the parallelism of crankshaft and wristpin bores and the squareness of the connecting rod face to the crankshaft bore.

Interchangeable—The first station has two sets of interchangeable air plugs. One set is for three sizes of crankshaft bores, the second for three sizes of wristpin bores.

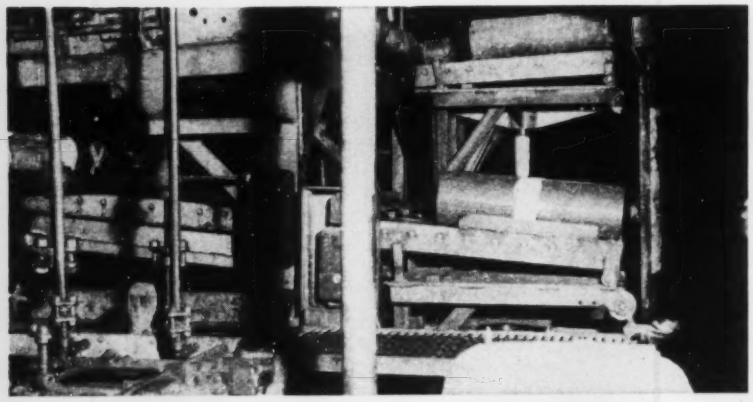
Crankshaft-bore plugs are in a fixed position; plugs for the wristpin bore are mounted on a spring loaded slide in one of three positions, depending on the length of the rod.

Each plug has two air jets, 0.400-in. apart, one directly above the other. The top jet is connected to one side of the air gaging system, the bottom jet to the other side. A meter connected between the two sides detects any unbalance in air pressure. This pressure differential tells how much the two bores are out of parallel.

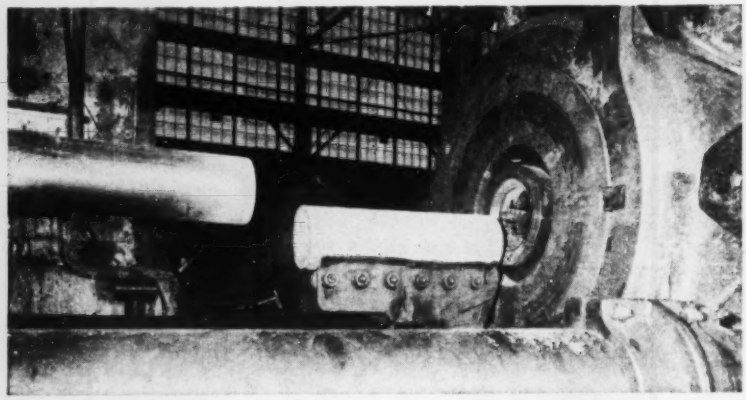
Gaging—Placing the connecting rod over the plugs quickly checks parallelism of the holes. Workpiece tolerance is 0.0015-in. over a 6-in. length. Since the spacing between top and bottom jets is only 0.400-in., this corresponds to a 0.0001-in. reading on the meter.

The second station checks squareness of crankshaft bore to rod face. Three interchangeable plugs handle the different rod sizes. The workpiece is clamped and rotated on the plug to show total variation from squareness.

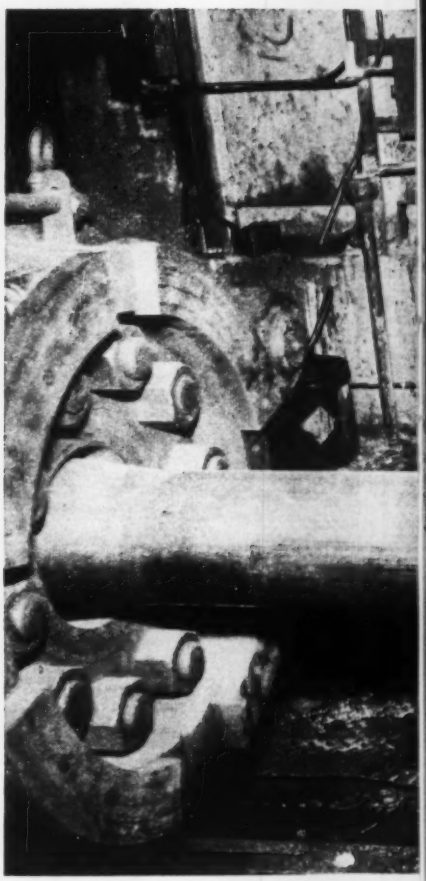
Carrier Corp.'s gage was made by Federal Products Corp., Providence, R. I.



First step: Heat the billet. Short-lift conveyor section puts billets in line three at a time with pusher rams (top). Furnace is 70 ft long. One man controls all operations



Red hot brass is ready for the big push. This roller section lifts it from the furnace conveyor to the ram level of the Loewy press



After the billet is in the press, the ram retracts and a steel dummy (above) is inserted. Like a cork, it

Carbide Cuts Extrusion Costs

Extruding hot brass billets into rods is a tough job for ordinary dies. Chrome carbide overcomes many of the problems, reduces down time for die changing. Here's how Mueller Brass Co. does it

CHROME-carbide dies cut hot extrusion costs two-thirds at Mueller Brass Co., Port Huron, Mich.

Old style dies wore out too fast; changing them held up 100 per cent automation.

One man now controls brass extrusion from billet to rod.

Mueller Brass enjoys other features: More production per day with the same equipment; rod dimensions and hardness are more uniform; carbide dies need one-fifth the cleaning of steel dies.

It's Rough—Hot extrusion takes the starch out of good die materials for two reasons: Tremendous pressures and high temperatures.

At Mueller Brass, an 8-in. billet becomes a 400 ft long, 0.441-in. rod in a single push. A 2750-ton, double-action, Loewy press does it so fast that a six-row furnace, which is 70 ft long, is needed to heat billets.

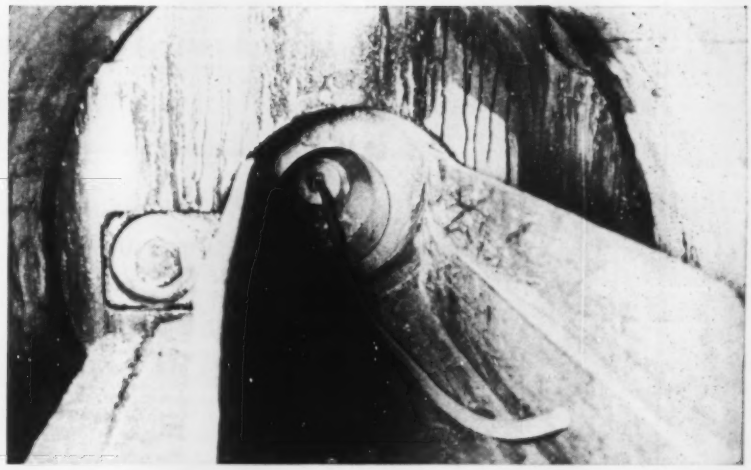
Under heat and pressure, steel dies gradually close or cave in. Frequent die changes are necessary to maintain close tolerances.

Chrome-carbide dies have a close-in of 0.003 to 0.005-in. in the 0.441 size. Tolerances are much easier to hold.

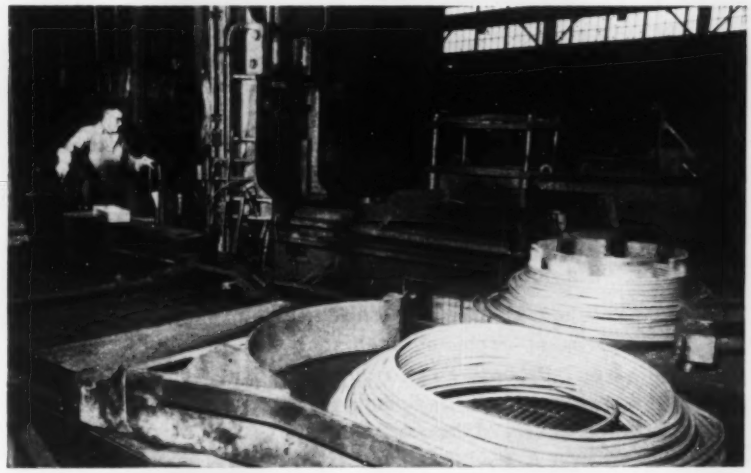
Hairline cracks are a much smaller problem with chrome carbide. Such cracks in steel widen as the die wears, producing ridges and similar surface imperfections. They remain small throughout the life of the chrome-carbide type.

Cleaning — Extrusion dies must be cleaned regularly. Oxide is

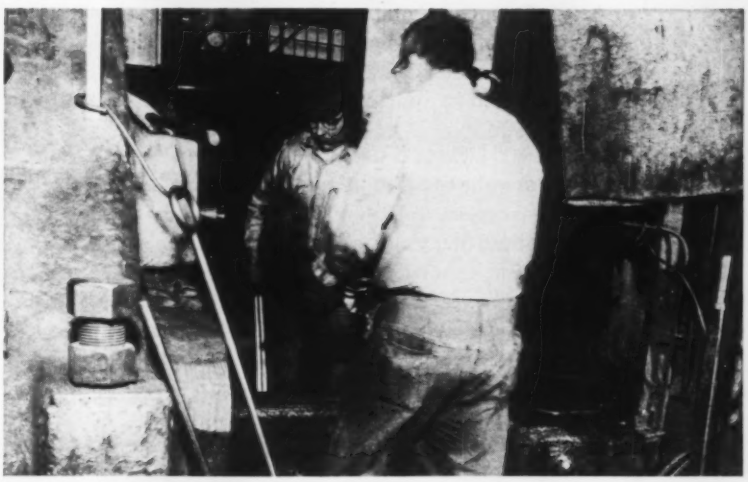
prevents a backflow of hot brass when the pressure is on. Another billet is arriving (top)



This is the business end of the Carboloy chrome-carbide die. The diameter of this rod is 0.441 in.



Motorized rod winders at the exit of the 2750-ton press make coils like these. Press is in the background (left)



After each push, the die head and die are pulled out of the press platen and sprayed with moisturized air (right). Workmen here are removing the butt end of a billet

hard to remove. The reconditioning process enlarges the die, making it necessary to sidetrack it to other operations.

Chrome-carbide dies recondition more easily, leaving the surface smooth enough for further use in the same operation. For one type rod, reconditioning helps carbide outlast steel by 20 to 1, although the average for all types is 5 to 1.

Replacements — Mueller Brass uses nibs made from Carboloy 608 chrome carbide. They are furnished in the correct diameter for inserting in a high-tungsten, high-chromium, hot-work steel holder. It is heated to about 1000°F before the nib is inserted. Cooling gives a shrink fit.

The bulk of long run extrusion at Mueller Brass is done with chrome carbide. Other types are used mainly for short runs and special shapes.

NO REASON WHY YOU CAN'T DO IT, TOO!

Typical of the Mueller Climatrol line is this summer air conditioner and gas-fired winter air conditioner, now uniformly painted electrostatically with RANSBURG NO. 2 PROCESS

MUELLER CLIMATROL,
Milwaukee, increases paint mileage **40%** with
RANSBURG NO. 2 PROCESS

And, 10 men averaging 40 hours a week now do the work formerly handled by 24 men averaging 50 hours!

Painting used to be a bottleneck in the manufacture of heating and air conditioning equipment at Mueller Climatrol.

But not any more!

When Mueller modernized its finishing department—replacing hand spray with Ransburg No. 2 Process Electro-Spray—daily production was increased . . . finishing costs were cut . . . and quality of the work was improved.

Annually, Mueller coats over 10 million square feet of sheet metal, so a 40% increase in paint mileage—translated into paint dollars saved—is a sizeable figure. Pointing up other savings, a typical run of 400 furnace casings used to take 200 man hours to clean and hand spray. Mueller does it now in 60 hours!

NO REASON WHY YOU CAN'T DO IT, TOO!

Whatever your product, if your production justifies conveyorized painting, chances are one of the Ransburg Electro-Coating Processes can do it better, for less, with improved uniformity and quality of the work. Write for our new brochure which includes numerous examples of both large and small manufacturers of a variety of products who are enjoying the many advantages of *Ransburg Electrostatic Spray Painting.*

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RANSBURG

Safer Jet Engines

Parts subjected to high stresses in engines perform better when shot peened

SHOT peening improves the performance of turbine blades used in jet engines.

Engineers at the Fairchild Engine Division, Fairchild Corp., Deer Park, N. Y., say that it's a sure way to make the engines safer. At the hot end, gases blast by the vanes at 900 to 1000 mph. Turbine rotor speeds are in excess of 7500 rpm.

Method — Turbine vanes are forged from high temperature cobalt steel. Grooves are ground to provide correct alignment when they're mounted on the wheel. They form the base or points of contact with the wheel and are the points of greatest stress when the engine is running. It's the grooved portion of the blades that gets the shot peening. They're mounted on an airblast table which holds them so that only the grooves are peened.

CRITICAL POINT
. . . shot peened to improve performance

The airblast table, made by Pangborn Corp., Hagerstown, Md., is equipped with a flexible rubber ring that masks part of the vane and keeps the shot away from the vane blade. The fixture rotates and will handle 36 pieces. Production rate is 600 vanes an hour. Four, high intensity airblast nozzles are placed to hit the vanes equally from all directions.

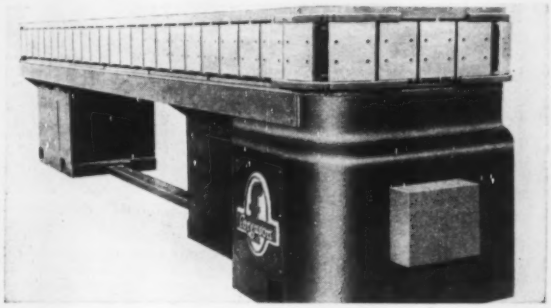
Jet turbine wheels and impellers, which are subject to severe stresses during operation, also get the peening treatment to improve their strength and fatigue life.

Transfer Machines Operate 8000 Hours Without Maintenance

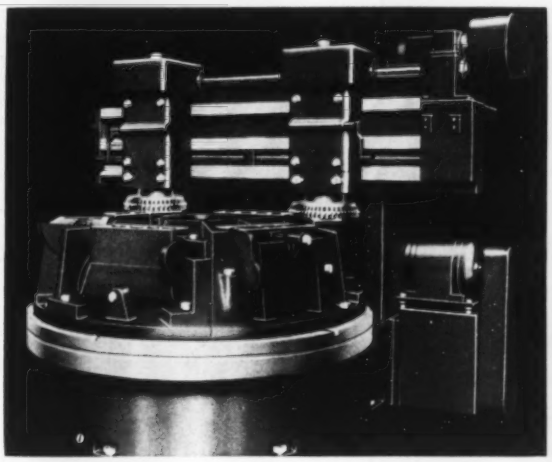
The Trans-O-Mator is a straight line transfer machine used for automatic machining and assembly operations.

It indexes smoothly and maintenance is low. It is rated for a minimum of 8000 hours of precision operation and may be used for as long as 20,000 hours without maintenance.

Strokes of 6, 8, 12, 16 and 24 in. are available. Standard lengths are 10, 14 and 18 ft. Other lengths are provided by changing the span between end castings. *Write*: Roller Gear Division, Ferguson Machine Corp., P.O. Box 5841, St. Louis 21, Mo.



Rotary Milling Machine Has Two Spindles



This vertical Niles miller feeds work continuously, in multiple setups, to the milling cutters.

The work is clamped by hand or, with optional equipment, held and released automatically.

The fixtures allow flexible setups. Finished work can be taken off the table and new work put on while the table is moving and both of the cutters are operating.

The table is 72 in. in diameter and can be set for speeds up to 100 in. an hour.

Spindle heads can be adjusted independently, both vertically and horizontally. In one pass, the operator can rough cut with one cutter and, at the same time, finish with the second. The machine will rough or finish cut on two levels in two different cutting circles. *Write*: Machine Tool Department, Box 174, Hamilton Division, Baldwin-Lima-Hamilton Corp., Hamilton, O. *Phone*: Twinbrook 4-6511

Induction Heater Uses 400-Cycle Current

Preheating and stress relieving can be done in one continuous cycle by this heater. There is no need to move the weldment for furnace treatment.

The heating unit can be adjusted to any schedule of heating, soaking and cooling rates. When preset to a particular program, it provides automatic and continuous control of temperature during processing.

When the preheat temperature has been selected, the controlling instrument heats to this temperature and holds it accurately until welding begins.

After the weld is completed, the desired stress relieving program is started automatically.

An accurate record of the entire heating program is provided on the instrument chart.

The unit is designed for 400-cycle current because of high hysteresis and eddy current losses.

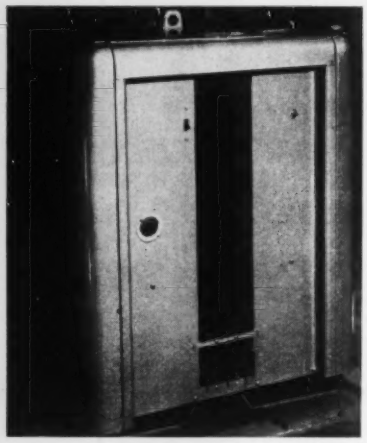
The low amperage used through the induction coil permits the use of a small diameter wire and fewer ampere turns — this eliminates excessive heat in the coil. *Write*: Hobart Bros. Co., Hobart Square, Troy, O. *Phone*: 2-1223

NEW PRODUCTS and equipment

Submerged Arc Welder

This alternating current, single phase machine has an operating range of 325 to 1000 amperes. Current control is motor driven.

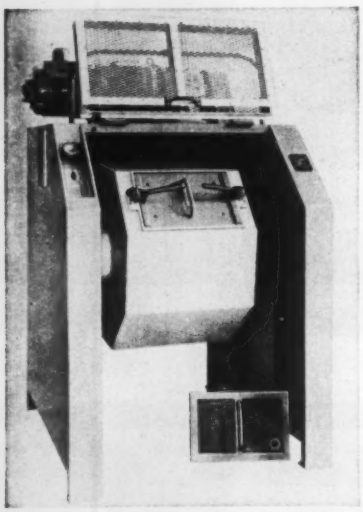
Controls are mounted permanently on the welder case. Remote control of welder output and primary contactor is available.



All coils are protected by class-H insulation. *Write*: Welding Department, General Electric Co., Schenectady 5, N. Y. *Phone*: Franklin 4-2211

Finishing Barrel

This 22 x 32 in. finishing barrel is made of welded steel plate and will hold 1200 lb. It comes in single or double compartment models, with or without neoprene linings.



Speeds are 7 to 30 rpm. *Write*: Abbott Ball Co., Hartford, Conn. *Phone*: Jackson 3-4231

Hard Facing Electrodes

These iron powder electrodes deposit dense welds which are free of porosity. A good fusion bond is formed with the base metal or build-up material.

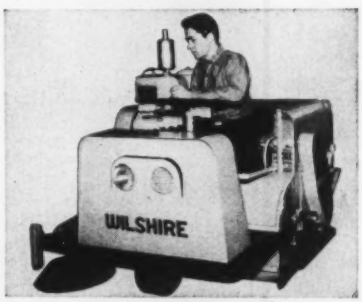
Weld-Arc 3 I.P. is an electrode for the build-up of worn parts. Wear-Arc 6 I.P. is an all-position electrode with good resistance to abrasion, impact and compression. Weld-Arc 12 I.P. is for resistance to wear caused by heavy impact and abrasion.

The electrodes have high deposition rates. *Write*: Alloy Rods Co., 3542 Lincoln Highway West, York, Pa. *Phone*: 7818

Floor Sweeper

This machine can operate for 8 hours on one tank of gas. Powered by an air cooled, 15 hp Wisconsin engine, it will work at speeds up to 10 mph.

A high volume fan deposits all dust into a bag which can be cleaned without being removed from the machine.



Bulk debris can be handled because the sweeping chamber has a 7-in. lift. *Write*: Wilshire Power Sweeper Co., Dundee Ave., Elgin, Ill. *Phone*: Sherwood 1-9111

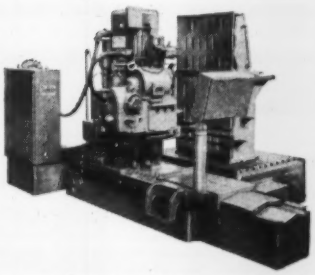
Production Control Unit

The Count-O-Larm system records the production of each machine, each shift and the time the machine is not producing.

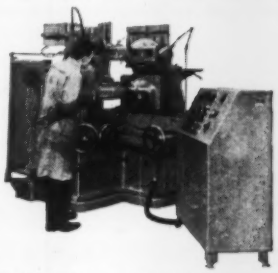
In addition to a master counter panel, it has a substation signal panel. When a machine is out of stock, an alarm buzzer draws the operator's attention to the substa-

(Advertisement)

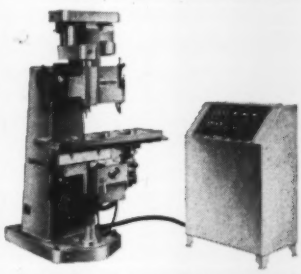
A P&W Tracer-Controlled
MILLER
FOR EVERY
JOB



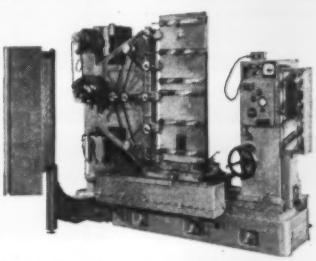
KELLER TYPE BG-21 . . . a powerful, versatile machine in a range of sizes from 5′ x 2½′ to 10′ x 4′, in single and 2-spindle models.



KELLER TYPE BL . . . a compact, powerful Tracer-Controlled Miller for work within the range of 36″ x 20″. With all new Keller features. Single and 3-spindle models.



VELVETRACE® MILLING MACHINE . . . duplicates the finest detail with extreme precision. New, non-contacting tracer control cannot damage the softest, most fragile 3-dimensional models.



AUTOMATIC DUPLICATION MACHINES . . . automatically reproduces original forging dies and glass or plastic molds with remarkable precision and detail. Two versions, one for molds, one for dies, with 1, 2 or 4 spindles.

PHOTO COURTESY OF ALUMINUM COMPANY OF AMERICA

To machine the WORLD'S LARGEST DIE,

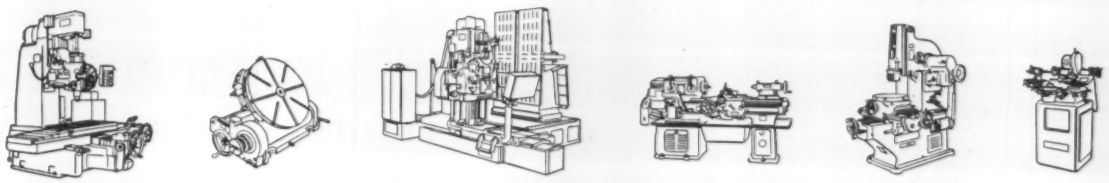
ALCOA chose the Keller . . .

. . . AUTOMATIC TRACER-CONTROLLED MILLING MACHINE

Consisting of two halves, each weighing 30 tons, this is the world's largest closed die block. Designed to forge aluminum backbones of fuselage and wing structures for the new multi-jet Martin SeaMaster, this giant die was produced on a P&W Keller BG-22 at the U.S. Air Force Heavy Press Plant operated by Aluminum Company of America.

Chances are that your own workpieces aren't as large as this die, but there is a Pratt & Whitney Keller Automatic Tracer-Controlled Miller for *every* worksize requirement. *Every* Keller Machine offers the same important advantages: fast, accurate reproduction of complex 3-dimensional shapes, extreme versatility and an overall ability to produce highest work quality economically. These advantages will also make Keller *your* first choice for a wide variety of die, mold and other hard-to-handle 2- and 3-dimensional milling jobs. Write now for complete information.

Pratt & Whitney Company, Incorporated, 13 Charter Oak Boulevard, West Hartford, Conn.



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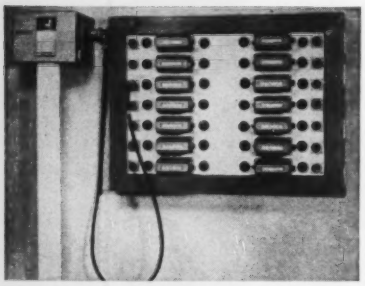
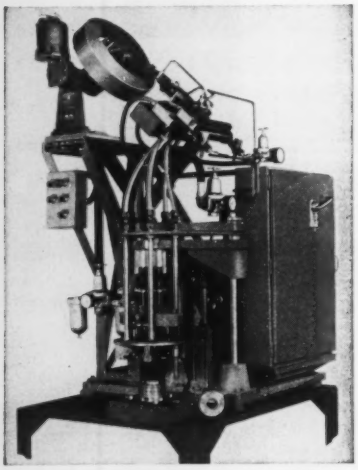


tion where a light indicates the idle machine. *Write*: Count-O-Larm Co., 1910 N. Elston Ave., Chicago, Ill. *Phone*: Humbolt 6-5120

Screw Driver Is Automatic

This torque control unit will feed and drive five screws in a transmission stator at a time without indexing or fixtures.

It is mounted on a plate as a component part of the assembly line. Rating: 3500 screws an hour.



All controls are connected so that further operation is prevented until each cycle is completed properly. *Write*: D & L Tool & Machine Co., 990 S. Oakwood Ave., Detroit 17, Mich. *Phone*: Vinewood 3-5600

Welding Electrode

Hardalloy 32 is an iron powder, low hydrogen electrode that deposits a surface which resists impact and moderate abrasion.

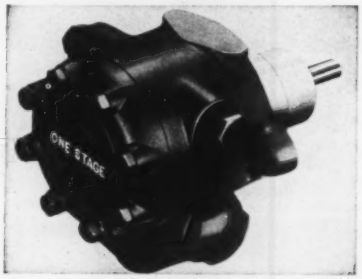
Sound, crack-free welds can be deposited on carbon steels and austenitic manganese steel with alternating or direct current welding equipment.

Slag removal is easy and clean. *Write*: McKay Co., 1005 Liberty Ave., Pittsburgh 22, Pa. *Phone*: Riverside 6-6521

Oil Pumps

Lubricating, hydraulic and light fuel oils are handled by Model OB pumps. Standard models provide pressures up to 300 psi and speeds up to 1800 rpm. Specially geared models have speeds up to 3600 rpm.

Pumping capacities are 24, 30 and 39 gallons an hour.



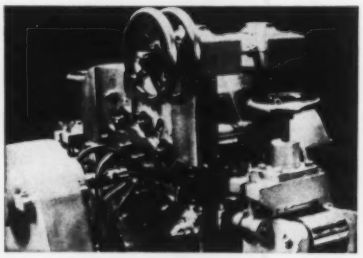
The special tooth form of the pumping elements reduces friction and provides positive pumping action that produces a vacuum of 20 to 25 in. of mercury. *Write*: Sundstrand Hydraulic Division, Sundstrand Machine Tool Co., 2210 Harrison Ave., Rockford, Ill. *Phone*: 2-7771

Cluster Mill Rolls Thin Strip

This reversing mill can roll strip from about 0.010 to 0.0001 in. finishing thickness.

The machine comes in a number of sizes, using work rolls such as 7/16 x 4 in., ¼ x 4 in. and 5/32 x 3 in. Generally, a variable speed range up to 100 fpm and a coil build-up range from 6 in. ID to 12 in. OD are provided.

By using a dual set of coilers,



a tension range as high as 1000:1 can be obtained. *Write*: Loma Machine Mfg. Co. Inc., 114 W. 32nd St., New York 16, N. Y. *Phone*: Murray Hill 5-6410

Wear Plates for Dies

These aluminum bronze plates are for dies with cam or sliding action. They are made by a cladding process which bonds aluminum bronze to a steel base.

The base machines easily for fitting to dies. You can drill or counterbore the aluminum bronze without difficulty.

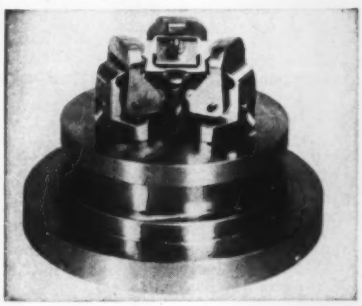
Plates can be made to specification or delivered completely finished from stock.

They are ground parallel and flat to ±0.0005 in. *Write*: Department AF-55, Ohio Knife Co., Cincinnati, O. *Phone*: Kerby 1-1623

Chuck Holds Bevel Gears

This chuck has a location in which has a freely rotating contact ball that automatically adjusts to a new contact point with each loading and unloading of the work.

Should the ball wear down, it can be replaced at low cost.



The chuck is a self-contained unit with cylinder and mounting plate. *Write*: Splinemaster Products Co., 6781 Maxwell, Van Dyke, Mich.

Transfer Unit for Presses

The Press Pacer converts any standard press into an automated machine capable of handling progressive operations and a broader range of sizes.

The portable unit transfers stampings from one die station to the next on each stroke of the ram. It also can be used to trans-

OVER-DESIGNING?

If you are designing bronze parts for mass production, there is a good chance that you are specifying a more costly alloy than you need.

ASARCO's patented continuous-casting process produces alloys according to SAE, ASTM and Government specifications. But their performance is entirely unlike that of similar alloys cast in sand or permanent molds. Relatively low-cost alloys cast by the ASARCO process perform like more expensive alloys cast by other methods.

For example, compare Continuous-Cast SAE 660 (ASARCON 773) with more expensive sand-cast alloys:

	Typical Yield Strength	Typical Impact Strength	Brinell Hardness
ASARCON 773	27,000 psi	12.5 ft.-lbs.	72
Sand-Cast SAE 62	20,000 psi	8.7 ft.-lbs.	65
Sand-Cast SAE 64	17,000 psi	8.2 ft.-lbs.	62

Unless you've checked to see whether the unique ASARCO bronzes can give you what you need, there's a possibility that you're over-designing. You may even be able to replace aluminum and manganese bronzes with low-cost ASARCON Continuous-Cast bronzes under certain conditions. Over-designing can be expensive in mass production, even if you are spending only a penny or two extra per pound of bronze.

ASARCON 773 (SAE 660) is readily available from stock in a wide range of sizes. An added bonus is the fact that ASARCON 773 is exceptionally free-machining. Rods, tubes, and numerous "extruded" shapes up to 9 inches in diameter are cast to order by ASARCO in more than 20 alloys.

We'll be happy to send you a free booklet describing the process and the product.

Continuous-Cast Products Department

AMERICAN SMELTING AND REFINING COMPANY

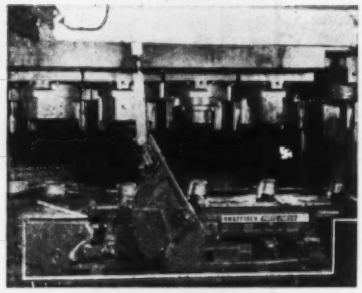
Perth Amboy Plant, Barber, New Jersey • Whiting, Indiana

WEST COAST SALES AGENT: Kingwell Bros. Ltd., 457 Minna Street, San Francisco IN CANADA: Federated Metals Canada, Ltd., Toronto and Montreal

fer parts between presses.

The transfer unit can move parts through a number of die operations simultaneously — such as blank, draw, pierce and trim. It is adjustable for different spacings between dies and also for different ram strokes.

The unit is bolted to the bed of the press. It can be installed to run front to back or left to right.



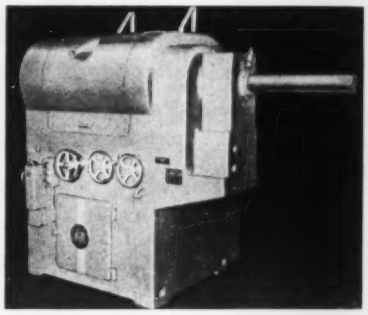
The stroke can be adjusted up to 12 in., and the the transfer distance can be set anywhere between 8 and 36 in. *Write*: Contact Services Division, Sheffield Corp., Dayton 1, O. *Phone*: Kenmore 3131

Noise Inspection for Gears

Model 1129-SP uses enclosed spindles and a built-in listening horn for better definition of noise characteristics of mating gears.

Contact microphones and other acoustical equipment can be provided.

Operation: Only one spindle (reversible) is driven. Variable brake loads are applied to the opposite spindle. A constant torque, ¾-hp motor gives spindle speeds of 580, 870, 1160 and 1740 rpm.

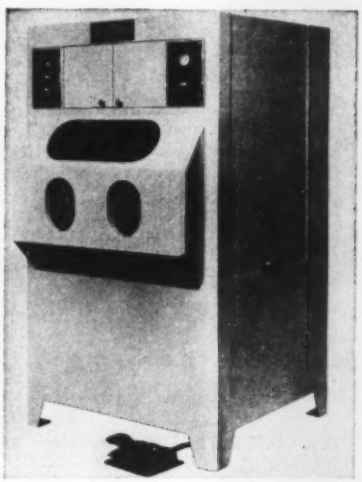


The speeder will test gears up to a diameter of 23 in. Maximum face width is 10 in. *Write*: Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich. *Phone*: Twinbrook 1-3111

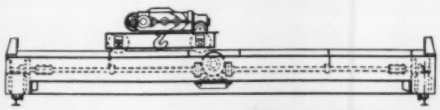
Wet Honing Machine

Cleaning, deburring, honing or polishing can be done by this wet pressure blaster.

A press of a button starts the agitation of the slurry no matter

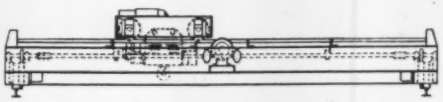


STANDARD HEADROOM
Provides highest hook height with top-running trolley and foot mounted hoisting unit.



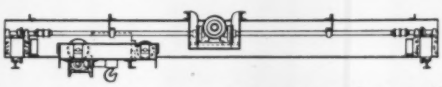
Model DTMD—TT

MEDIUM HEADROOM
Here the hoisting unit is rigidly suspended from the top-running trolley to reduce clearance over rail.



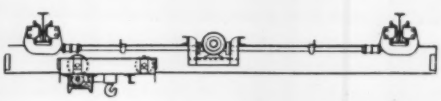
Model DTMD—LT

LOW HEADROOM
Under-running trolley permits unusually high hook lift. Use it where clearance under bridge must be maximum.



Model DTMD—UT

SUSPENDED TRACK
Operates on lower flange of crane runway suspended from roof guiders or other overhead support. Use also where load transfer is desired.



Model DUMD—UT

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for any building condition

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Describes in detail the many design and operating advantages of CRANEMASTER overhead traveling cranes. Also explains how Abell-Howe provides competent service from original survey to final installation.

ABELL-HOWE COMPANY 7747 Van Buren Street • Forest Park, Illinois

BUY PROFIT IN ALCO CIRCULAR FORGINGS

Hi-Qua-Led* Steel forgings, available in any AISI Open Hearth Grade, can reduce machining time more than half, or increase tool life up to 1600 per cent. ALCO's experience and equipment build cost-reducing uniformity into standard circular forgings from 18- to 145-in. OD.

The big news is Hi-Qua-Led Steel. It was developed by ALCO to lower your machining costs on circular forgings — particularly in applications where a lot of metal must be removed. So far, customers using Hi-Qua-Led Steel forgings have reported as high as 69 per cent improvement in turning time, 41.2 per cent in teeth-cutting time. Hobbing tool life has been increased up to 1600 per cent. Even surface finish has been improved markedly.

There is no change in steel properties in Hi-Qua-Led Steel. It can be expected to perform exactly like a regular steel in the same grade. Customers report same response to heat treatment as regular steels.

You can profitably use Hi-Qua-Led Steel forgings if you put four or more hours machining into a circular forged piece, or if you do hobbing or other tough machining jobs with expensive tools. If your machining is not extensive, ALCO's regular circular forgings can still save you money with their high uniformity and exact conformance to your specifications.

We'd like you to have full information. Your nearest ALCO sales office will be happy to provide it, or, if you wish, you can receive complete explanatory information in Bulletins SF-1 and SF-2 by writing Spring & Forge Division, Dept. OCF-1, P.O. Box 1065, Schenectady 1, New York.

*Trademark reg. applied for. Patent applied for on lead-addition method.

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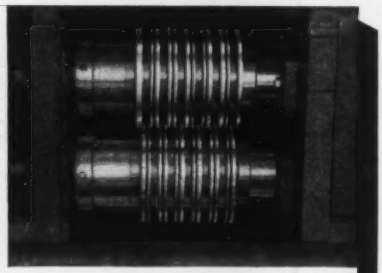
COWLES
SLITTING KNIVES



Cut costs 3 ways

Cowles knives reduce set-up time. They are made so accurately they can be assembled on the arbor without shimming. Cowles knives stay on the job longer;— they reduce down-time for re-grinding; and produce straight edged strip with minimum burr avoiding tie-ups in blanking operations.

For maximum economy and satisfaction order your knives and spacers from Cowles, world's largest manufacturer of rotary slitting knives. Prompt delivery. Complete range of sizes and analyses for slitting high and low carbon steels, stainless, alloys, silicon or non-ferrous metals.

Engineering Assistance On Any Slitting Job!

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Send me "Facts for the Manufacturer" with information about my particular industry.

Name _____ **Title** _____

Company _____

Address _____

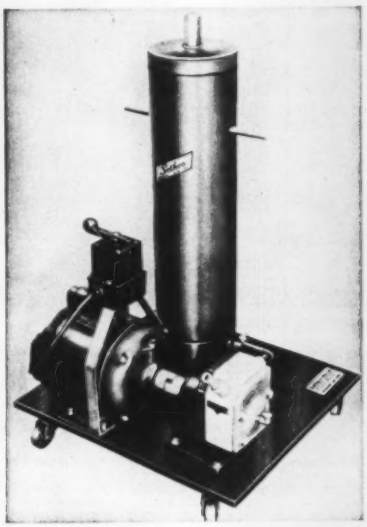
Product _____

how long it has been standing idle.

Any abrasive with 30 to 500 mesh can be used. *Write*: Clementina Ltd., 2277 Jerrold Ave., San Francisco 24, Calif. *Phone*: Atwater 2-1429

Pump Filters Solutions

This plastic, self-priming pump, VPHI-20, removes particles as small as 1 micron from acid or alkaline electroplating and industrial solutions—including chromic, fluoroboric and nitric acid; iron and lead fluoroborate; ferric chloride; silver nitrate and sodium hypochlorite.



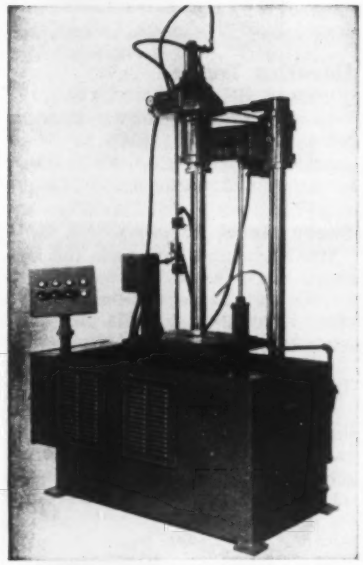
The pump will not leak; there are no metal parts that are wetted. It is connected by a flexible coupling to a ¼-hp motor and has a filtering capacity of 50 to 300 gallons an hour.

The Dynel filter can be cleaned by reversing the pump. *Write*: Sethco Mfg. Co., 70-78 Willoughby St., Brooklyn 1, N. Y. *Phone*: Ulster 5-8940

Vertical Honing Machine

The VA honer is a production machine with a capacity up to 4 in. in diameter and 12 in. high. Stroking lengths are controlled and set by adjustable limit switches..

The honing cycle is controlled by



an electronic timer adjustable between 6 and 120 seconds. Spindle speeds are infinitely variable from 225 to 550 rpm. Stone pressure is controlled and set by a regulator valve and pressure dial.

The ground table is adjustable four ways for squareness. *Write*: Superior Hone Corp., 1620 Elreno St., Elkhart, Ind. *Phone*: 4-0496

Punch Press

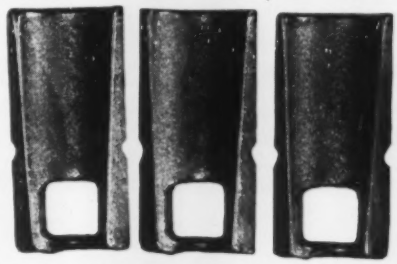
Side rails, fish plates, wraparounds and other frame members can be made by the R-152 turret punch press. It has a capacity of 150 tons and punches holes in channeled frame members up to ⅜-in. thick.

Work is located mechanically and punched without a layout. Left and right hand members are handled with equal ease regardless of length.

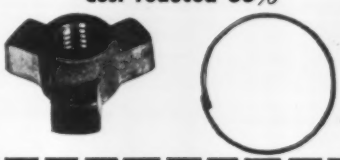
A handwheel positions the work. A work chart shows the required tool or turret station number and the dimension from the two edges of work for each hole. Two dials in the control station show the dimensions corresponding to the work position.

Twenty punches and dies up to 3 in. in diameter or 3 in. square are carried in the turrets. *Write*: Department 385, Wiedemann Machine Co., 4272 Wissahickon Ave., Philadelphia 32, Pa. *Phone*: Baldwin 3-2850

Convert multi-piece assemblies into single units . . . made of Malleable Iron



5 pieces replaced with 1
Cost reduced 66%



You can improve design, reduce production cost, simplify handling.

Here is a typical example of how Malleable Foundry engineers have helped manufacturers to improve parts and entire products by switching to Malleable. The experience of our Society's members covers *hundreds* more, with varying case histories that repeat and repeat these basic gains:

1. One-piece construction.
2. Appearance greatly improved.
3. More easily machined into final part.
4. Cost reduced.

. . . all made possible by the inherent qualities of Malleable Iron —toughness, ductility, machinability, and ultimate tensile strength to suit the need.

How about Malleable?

Consult your Malleable Engineer at the drawing board stage

Whether you are designing new products or parts, or reviewing present production—keep Malleable Castings in mind. It's the ideal material for economy and quality in manufacturing. Write to Malleable Founders' Society for copies of "Malleable Iron Facts."

Malleable Founders' Society

1800 Union Commerce Building Cleveland 14, Ohio

THE FINISHING TOUCH

by A. B. Hoefer
Vice President
FREDERIC B. STEVENS, INC.

WILL ANODIZED ALUMINUM REPLACE CHROME?

Affirmative answers to this question are revealed in several current business publications and our own sales figures.

Speeding the change is the continued tight supply of nickel. Manufacturers have been forced to look for substitutes and like results anodized aluminum have given them.

A trend is developing. Volume of Stevens anodizing equipment sold in 1955 was nearly double the volume for the two preceding years. At the same time, sales of Stevens compositions used in buffing and polishing aluminum were showing a 50% increase.

THE TREND INDICATES MORE ANODIZED ALUMINUM IN 1957 and 1958!

This Stevens advertisement predicting an increasing use of anodized aluminum, ran over a year ago.

SEE STEVENS FOR AUTOMATIC ANODIZING EQUIPMENT

The increasing demand for more color and more elaborate styling is rocketing the use of anodized aluminum for tumblers, kitchen utensils, refrigerator components, lighting reflectors and many other items.

The 1957 motor cars are using anodized aluminum for medallions, kick plates, grilles, window frames, etc.

To obtain the finest aluminum finishes – at the lowest costs – see your Stevens Representative. Stevens' experience in furnishing complete anodizing equipment assures you of the latest techniques and the best in automatic machines. Let us discuss your requirements with you.

FOR FURTHER INFORMATION WRITE TO: *FREDERIC B. STEVENS, INC., 1820-18th STREET, DETROIT 16, MICHIGAN.*

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INCORPORATED
YOUR METAL FINISHING SUPERMARKET
DETROIT 16, MICHIGAN

STEVENS 75 YEARS OF SERVICE

WAREHOUSES AND OFFICES IN PRINCIPAL CITIES

NEW literature

Write directly to the company for a copy

Elevating Trucks

Bulletin HE-56, 8 pages, presents a line of portable manually operated trucks that lift as high as 96 in. American Pulley Co., 4200 Wissahickon Ave., Philadelphia 29, Pa.

Sheet Metal Forming

Hand machines and tools for light sheet metal work are described in bulletin 201, 32 pages. Niagara Machine & Tool Works, 683 Northland Ave., Buffalo 11, N. Y.

Tubular Screen Filters

Operations of automatic, self-cleaning vacuum filters with flow capacities of 5 to 1000 gpm are described in a 4-page bulletin. Department FM-297, Industrial Filtration Co., Lebanon, Ind.

Furnace Temperature Control

Control systems, thermocouples and instruments, control elements and special systems for heat treating furnaces are discussed in bulletin GER-1206, 21 pages. General Electric Co., Schenectady 5, N. Y.

Machine Tools

Engine lathes, toolroom lathes, turret lathes, vertical spindle milling machines, bench shapers, drill presses and pedestal tool grinders are described in catalog 5700, 80 pages. South Bend Lathe Works, South Bend 22, Ind.

Foundry Cleaning Rooms

Automation of airless abrasive blast cleaning in soil pipe foundries is described in this bulletin. Wheelabrator Corp., 1157 S. Byrkit St., Mishawaka, Ind.

Rolling Mill Bearings

Bulletin 436, 24 pages, contains engineering data on a cylindrical roller bearing for roll neck mountings on all types of hot and cold-rolling mills. Department 616, SKF Industries Inc., Front St. & Erie Ave., Philadelphia 32, Pa.

Industrial Air Tools

Catalog 53, 84 pages, contains specifications of 40 basic tools, their accessories and adapters. Thor Power Tool Co., Aurora, Ill.

Computation

This 32-page booklet presents interesting sidelights on mathematics and describes a computer which solves formulas that involve two

NEW LITERATURE . . .

variables, raised to any power, and a constant. A computer slide chart is included. Graham Transmissions Inc., Menomonee Falls, Wis.

Steel Cylinders

This 8-page bulletin gives specifications of 55 cylinders with capacities of 8.6 to 855 cu in. and service pressures of 300 to 3000 psi. Industrial Commodities Department, Walter Kidde & Co. Inc., 675 Main St., Belleville 9, N. J.

Limit Switches

Bulletin 956, 8 pages, describes 21 contact arrangements of heavy duty, machine tool switches. R. B. Denison Mfg. Co., 102 St. Clair Ave., Cleveland 13, O.

Industrial Locomotives

Bulletin GEA-6332, 24 pages, presents case histories on 14 switcher-type and mining locomotives. Advertising & Sales Promotion Department, General Electric Co., Schenectady 5, N. Y.

Aircraft Tubing

This chart compares specifications of stainless, alloy and carbon steel tubing. Tube Distributors Co. Inc., Garden City, N. Y.

Ball-Transfer Unit

This 2-page bulletin S describes a steel ball used in transfer tables, ball-top stands and ball machine feeders. Metzgar Conveyor Co., 412 Douglas St. N. W., Grand Rapids 4, Mich.

Mercury Switches

Automatic controls which use sealed mercury contact switches for heating, ventilating, air conditioning and industrial equipment are described in catalog 857, 56 pages. Mercoid Corp., 4201 Belmont Ave., Chicago 41, Ill.

High Tension Separators

Minerals which can be separated by high tension units are listed in this 4-page bulletin, HTB-103. Carpco Mfg. Inc., P.O. Box 3272, Jacksonville 6, Fla.

Thermostat

A direct acting control that protects equipment from exceeding preselected temperature limits (up to 800°F) is described in bulletin RT-809, 4 pages. Robertshaw - Fulton Controls Co., 110 E. Otterman St., Greensburg, Pa.

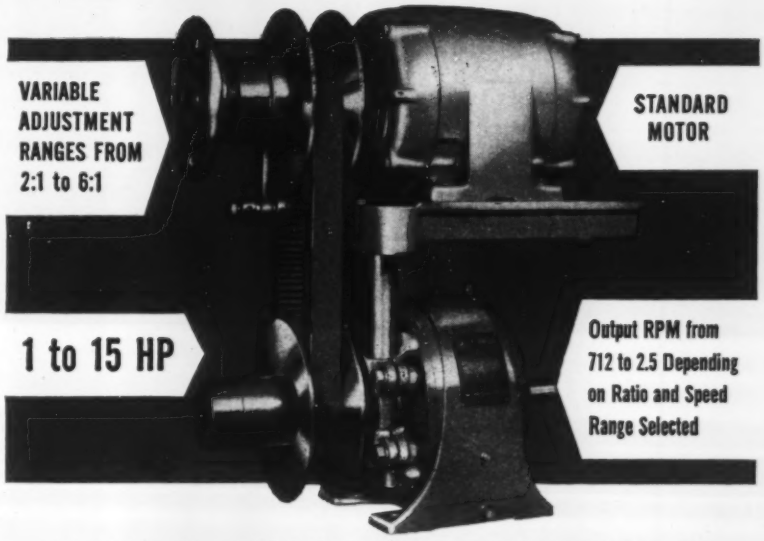
Lathes

Engine, toolroom and fixed gap bed lathes which have a tray on top of the headstock and the tailstock for

NEW FROM FOOTE BROS.

Vari-Mount

VARIABLE SPEED MOTORIZED DRIVE


VARIABLE ADJUSTMENT RANGES FROM 2:1 to 6:1
STANDARD MOTOR
1 to 15 HP
Output RPM from 712 to 2.5 Depending on Ratio and Speed Range Selected

VARI-MOUNT—the new Variable Speed Motorized Drive offers infinitely variable speed selection, greater flexibility of operation, wide adaptability, easier maintenance and the sound design you expect from Foote Bros.

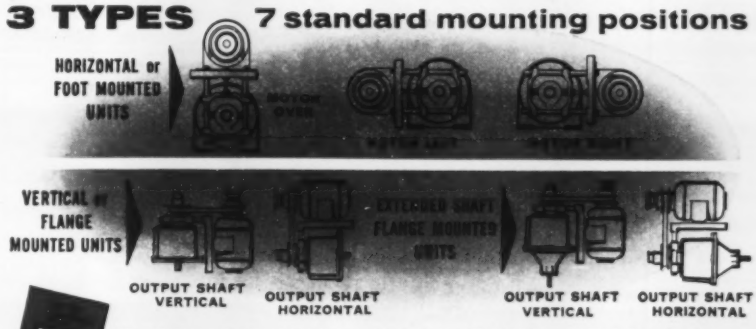
With a Vari-Mount, you can use your own motor—old or new NEMA Standard—or, the unit can be supplied with any standard motor of your choice. The Vari-Mount Reducer incorporates Duti-Rated Lifetime Gearing with file-hard tooth surfaces and tough, ductile cores for maximum life and efficiency.

Positive handwheel control of the adjustable pulley permits pin-point accuracy in speed selection over the entire range. Vari-Mount Units may be equipped with Remote or Automatic speed selection devices if required.

Spring loaded, self-centering Variable Pulley and close-coupled in line design insures permanent belt alignment, smoother performance, and minimum overhung load on motor bearing. No thrust load is imposed on motor bearings at any speed or during speed changes.

Quick belt changes made possible by the wide-open design of the Vari-Mount, together with easily accessible lubrication fittings make maintenance an easy matter.

3 TYPES 7 standard mounting positions



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Better Power Transmission Through Better Gears

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Ask Standard

how to cut costs with conveyors

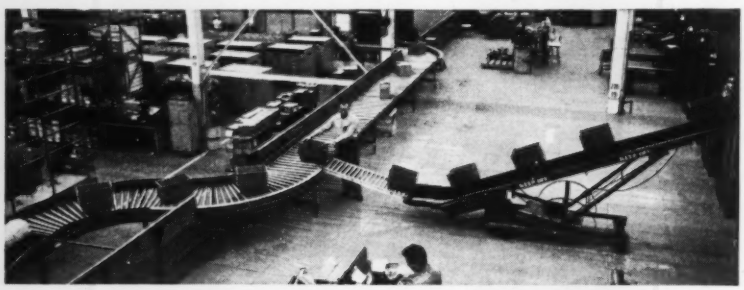
One of two Inclinebelt conveyors that carry parts to reversible live roller conveyor at second level. Belt conveyors are reversible to bring down outgoing parts. Note minimum space used for conveyors.

Multi-level conveyors help Douglas Aircraft CUT STORAGE AREA BY 2/3

When it's difficult to spread out — look up! That's what the El Segundo Division of Douglas Aircraft did when confronted with the need to triple the capacity of a parts stockroom facility.

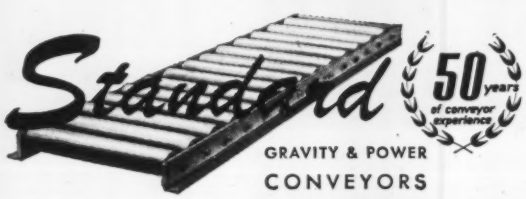
Today, instead of stocking parts on one level, they're using three. Movement of parts in and out of all three levels is quick, simple and efficient. They're doing it with Standard conveyors.

This relatively simple solution to what could have been a difficult problem is one example of how Standard Conveyors pay off in every industry. STANDARD CONVEYOR COMPANY, North St. Paul 9, Minnesota. Sales and Service in Principal Cities.



Third level is reached via portable Handibelt conveyor from reversible live roller conveyor. Patented easy-adjustment features of Handibelt permit quick reversing of flow.

For details on Standard Conveyors, help in selecting the right type and size to meet your needs, contact the Standard representative listed in your classified phone book or write direct. Ask for Bulletin **Y-2.**



NEW LITERATURE

tools and accessories are described in this 28-page bulletin. Cincinnati Lathe & Tool Co., Cincinnati 9, O.

Vortex Burner

Bulletin 111, 2 pages, describes a combined burner and combustion chamber which can release more than 1 million Btu per cu ft. Thermal Research & Engineering Corp., Conshohocken, Pa.

Permanent Magnets

This 12-page bulletin discusses design possibilities for permanent magnets, Thermistors and Thyrite varistors. Metallurgical Products Department, General Electric Co., Detroit 32, Mich.

Cold Flowing

Typical parts which can be made by cold flowing metals into tubular forms are depicted in this 4-page bulletin. Claude C. Slate Co., 1733 Flower St., Glendale 1, Calif.

Die-Casting Machines

This 8-page bulletin describes high pressure hydraulic machines of hot and cold chamber design. Cleveland Automatic Machine Co., Cincinnati 12, O.

NEW BOOKS

Proceedings of the 20th Anniversary Time and Motion Study and Management Clinic, Industrial Management Society, 35 E. Wacker Dr., Chicago 1, Ill. 112 pages, $5.

Here are transcripts of talks by leaders from labor, management and government on time study, motion economy, methods, work simplification, plant layout, production control, wage incentives, maintenance and job evaluation.

Modern Mathematics for the Engineer, Edwin F. Bechenbach, McGraw-Hill Book Co. Inc., 330 W. 42nd St., New York 36, N. Y. 514 pages, $7.50.

"Mathematical Models," the first phase of this three-part book, deals with physical problems expressed in terms of ordinary differential equations, integral equations and partial differential equations. "Probabilistic Problems" considers the programming and operational aspects of engineering and the use of probabilistic methods in solving problems. In "Computational Considerations," the emphasis is on numerical solution. The final chapter deals with high speed computing devices.

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GOOD SERVICE*

* *High quality* and *good service* are apt words to describe what you get when you buy tool and high-speed bar stock from *Jessop Steel.* Descriptive in the past—even more so today! For, during the last year, Jessop has greatly expanded its laboratory facilities for closer *quality-control* and radically adjusted its warehouse product-mix for *faster service.* Whether you buy bar stock, or any of the other products shown below, you'll find profit in sending your next order to *Jessop Steel.*

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OFFICES IN PRINCIPAL CITIES

Jessop Steel of Canada Limited, Wallaceburg, Toronto

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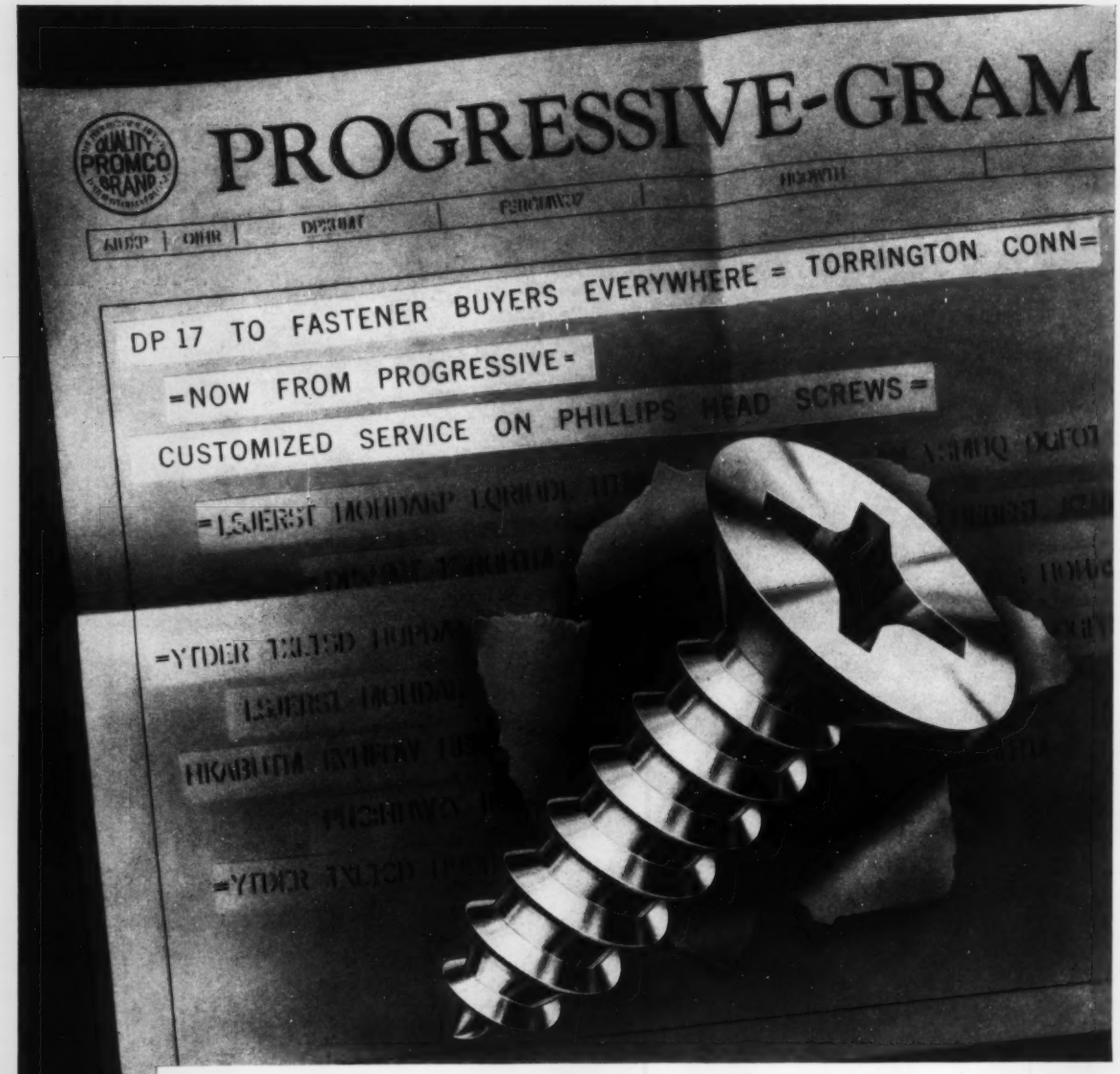

PROGRESSIVE-GRAM
QUALITY PROMCO GRAND
DP 17 TO FASTENER BUYERS EVERYWHERE = TORRINGTON CONN=
=NOW FROM PROGRESSIVE=
CUSTOMIZED SERVICE ON PHILLIPS HEAD SCREWS=

Now you can get from PROGRESSIVE Phillips Head Screws with an extra customized touch — Phillips Head Screws which are custom-made to your order. This means: (1) specifically made for you — not bin stock parts; (2) fast, custom-handling of every order; *plus* (3) the double economy of low initial cost *and* the savings in your assembly operations possible only with high precision, torsion-tested fasteners.

STANDARDS AND SPECIALS CUSTOMIZED FOR YOUR NEEDS

THE PROGRESSIVE MFG. CO.
Division of The Torrington Company
76 Norwood Street, Torrington, Connecticut

Market Outlook

TWO DEVELOPMENTS suggest the continuation of a busy year in the steel industry.

1. The scrap market shows a firming tendency. 2. Steel production edged a little higher.

You wouldn't see these two trends if business were going to pot.

LEVELING OUT—Scrap prices, which had been plunging from record heights for several weeks, began to level out in the week ended Feb. 20. In a few instances, prices turned upward. A mill in the Chicago area, for instance, offered $2 a ton more for industrial No. 1 heavy melting steel scrap than another mill had been paying. The firming is reflected by STEEL's price composite on steelmaking scrap. In the week ended Feb. 20, it declined 34 cents a ton—the smallest weekly drop since late December. Some of the weekly drops had been as much as $3.17. The composite now is $52.83 a gross ton—$13.34 below the record set in December.

PRODUCTION UP—The other mark of strength, production of steel for ingots and castings, rose half a point in the week ended Feb. 24. This put the rate of output up to 97.5 per cent of capacity. Eight weeks of this year have passed, and the ingot rate has not been lower than 96.5 per cent of capacity.

HIGH CONSUMPTION—Prime reason for high operations is the heavy consumption of steel. A good gage of consumption is the Federal Reserve Board's seasonally adjusted metal fabricating index. In January, it was 180 per cent of the 1947-1949 average. The only time the index was higher was in December, when it registered 182. Steel consumption in December exceeded mill shipments by almost half a million tons, reducing inventories.

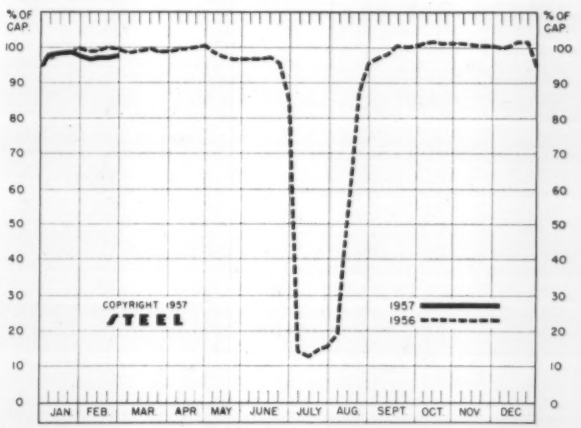
UPTREND—Steel prices continue to move upward, mainly through revision of extras, and there's speculation that pig iron prices will rise as a result of recent advances in prices of iron ore and coal. Pig iron went up $2.50 a ton last summer.

Bethlehem Steel Co. raised the base price of railway axles $5 a ton. In contrast to the uptrend in steel prices is a $1 a ton decrease in the base price of rail steel merchant bars made by Pollak Steel Co., Marion, O. Its new price is $5.10 per 100 lb.

INCREASES OPPOSED—The rise in steel prices has drawn fire from ten metalworking companies in the Gardner, Mass., area. They claim their steel costs are up an average of $7 a ton, which they cannot absorb or pass on. They charge the advances are not warranted. The ten objectors, through the Gardner Chamber of Commerce, are appealing to neighboring chambers to join in the protest. They also have appealed to Massachusetts members of Congress, Associated Industries of Massachusetts, U.S. Chamber of Commerce and the New England Council to join in the movement.

SWINGING BACK—A number of warehouses are returning to their old method of using a single base for quoting prices on hot-rolled bars. Early in 1956 when steel producers set up a base price on special quality bars, warehouses followed suit. They then had two base prices for bars: One for special quality and one for merchant quality.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

	Week Ended Feb. 24	Change	Same Week 1956	Same Week 1955
Pittsburgh	98	— 2*	103.5	90.5
Chicago	97	0*	99	93
Mid-Atlantic	98.5	0	101	87
Youngstown	104	+ 4	100	92
Wheeling	101	+ 1	99.5	94
Cleveland	94	— 2*	103.5	90
Buffalo	107.5	0	105	100
Birmingham	95.5	0	95	86.5
New England	70	+ 2	75	90
Cincinnati	89	+ 3	97	86.5
St. Louis	98	+ 7	106	102
Detroit	102	+ 0.5	102.5	88
Western	105	+ 2	108	90
National Rate	97.5	+ 0.5	99.5	90

INGOT PRODUCTION‡

	Week Ended Feb. 24	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	154.1†	155.7	153.9	151.5
NET TONS (In thousands)	2,475†	2,501	2,472	2,433

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,559,490 in 1957; 2,461,893 in 1956; 2,413,278 in 1955.

Metalworking Outlook—p. 47

Technical Outlook—p. 85

...AND A LITTLE GOES A LONG WAY...

VANADIUM

NO OTHER ALLOY IS SO VERSATILE...

Vanadium was an early arrival in the field of alloyed iron and steel, yet there is nothing old-fashioned about it but the price. It is about the same as it was 30 years ago!

Today vanadium is recognized for its usefulness and versatility — for it is employed to promote strength, ductility, toughness, wear resistance. In tool steels as in other steels, vanadium is added to reduce and control grain size, and additionally to improve cutting capacity and maintain cutting edges — in large forgings it is used to supply transverse and radial ductility, while in deep drawing rimming steels vanadium prevents aging. There are uses, too, in the nonferrous field, and in the chemical industry it serves varied purposes in glass, ceramics, inks, coloring agents, synthetic textiles.

Vanadium is not only versatile, but also economical, for a little goes a long way — hence its unique popularity. Call your nearest VCA office to learn more about Vancoram Vanadium Products.

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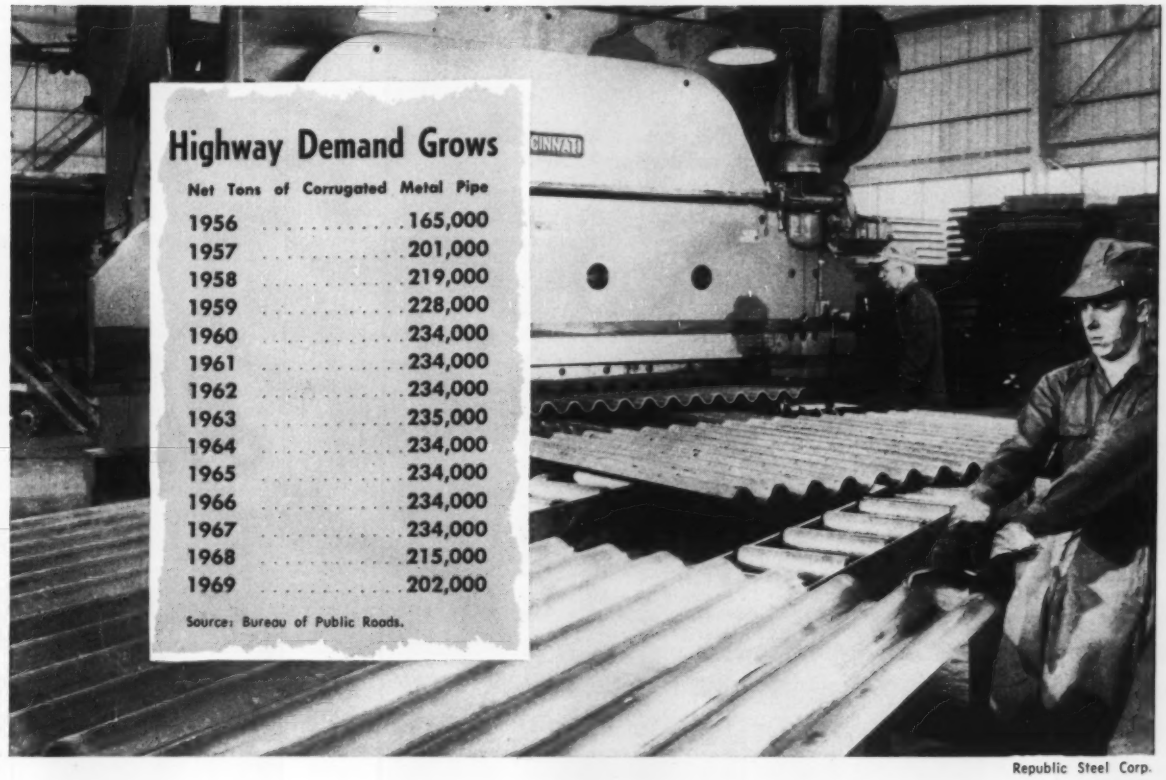

Highway Demand Grows

Net Tons of Corrugated Metal Pipe

1956	165,000
1957	201,000
1958	219,000
1959	228,000
1960	234,000
1961	234,000
1962	234,000
1963	235,000
1964	234,000
1965	234,000
1966	234,000
1967	234,000
1968	215,000
1969	202,000

Source: Bureau of Public Roads.

Republic Steel Corp.

Culvert Sheet Supply Good

There will be no shortage of this small tonnage item as the roadbuilding program gets under way. Continuous galvanizing lines assure adequate production

THE SUPPLY of culvert sheets to make corrugated pipe for the government's roadbuilding program will be one of the least of the problems when the program emerges from the drawing room. There's plenty of capacity for this product right now.

Although this is one of the "minor" needs of the highway planners, demand for culvert sheets will increase fast enough (see table above) that it could gum up the works if the steel industry were not prepared for it. But according to an official at Armco Steel Corp., one of the larger producers: "If the industry were to produce all year at the rate it does during the six or so seasonal months, it could supply all the culvert sheets the road program will ever need."

Build-Up—The heavy demand for culvert sheets has been building up for several years because of the increase in roadbuilding even before the government came into the picture in a big way. At least two major producers—Jones & Laughling Steel Corp., Pittsburgh, and Granite City Steel Co., Granite City, Ill., entered the business within the past year. Both are using new continuous galvanizing lines for this heavy gage sheet. Continental Steel Corp., Kokomo, Ind., has increased its run of culvert sheets by 30 per cent in the last six months. Others report they are ready to increase the allotment of ingots to this product whenever the need arises.

The tremendous increase in continuous galvanizing lines virtually assures an almost inexhaustible supply of this low-tonnage item. While there was some difficulty at first adapting these lines to the heavier coating required of culvert sheets, those problems are pretty well ironed out. Producers still using the old hot-dipped method say that conversion from production of regular galvanized to culvert sheets is fairly simple, although preparation of the metal for the heavier coat of spelter is a bit of the problem. Some producers use the shotblast method to roughen the surface of the sheet. In such cases, the only real limit to capacity is the volume shotblasters can handle. This is fairly easy to solve because the equipment is readily available and not too expensive.

Enough Fabricators—Only a few of the dozen or so producers fab-

ricate the sheets into pipe, the form most commonly used in roadbuilding. Shipping is the big problem. To reduce transportation costs, the pipe is "nested," cutting down the bulk. But most producers prefer to ship the sheets to fabricators closer to the construction site. There is no shortage of fabricators.

There are three standard grades of culvert sheets — copper iron, copper bearing steel and pure iron —although some producers turn out their own variations for competitive reasons. But the most popular is the copper-bearing sheet. One U.S. Steel Corp. official believes that 80 per cent of the roadbuilding requirements are in this grade.

Ready, Willing, Able—The full impact of the government's program will not be felt for another year or two. There will be some pickup this summer as state and county systems get under way. If there is any further delay in roadbuilding, it won't be the fault of the culvert sheet producers.

7827-HC

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Electrolytic corrosion is the biggest single destroyer of buried or submerged metal structures and pipelines.

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PHILADELPHIA • SALT LAKE CITY • SEATTLE • ST. LOUIS • TORONTO, CANADA

Sheets, Strip . . .

Sheet & Strip Prices, Pages 142 & 143

Sheet demand continues on the easy side. More mills are reaching out beyond their normal marketing areas for tonnage; freight absorption is increasing. A midwestern maker who has been absorbing only $3 freight on shipments of cold-rolled sheets ($2 on galvanized) to the Philadelphia area is absorbing up to $6; this extends to enameling stock. Formerly, no freight was absorbed on this product. On hot-rolled sheets, this mill is absorbing $4 freight.

As the second quarter nears, specifications are increasing. But there is nothing to indicate hot and cold sheet requirements will be any larger than they were in the first quarter. In fact, in some lines of household appliances — stoves, refrigerators, deep freezers and sanitary ware—specifications may be off, judging from estimates by some of these manufacturers. The decline in their sheet needs would extend to enameling stock, but any slump here would likely be bolstered by continued good demand from job enamelers.

Demand for the lighter steel products later this year will hinge pretty much on what happens in auto production. This applies particularly to hot and cold sheets, hot and cold-rolled bars and manufacturers wire items. The auto firms are jockeying around in their ordering. Some are cutting back; some are increasing tonnage commitments. A Pittsburgh mill says its unfilled orders for hot-rolled sheets now are 15 per cent below the tonnage held one month ago. On cold-rolled sheets the backlog is down 10 per cent.

Some government grain bin tonnage is coming into the market. This will not help galvanized sheet distributors reduce their heavy stocks, but it will stimulate some activity at the mill level since the sheets will be bought direct from the producers because of the price advantages.

Demand for high silicon sheets is strong, in contrast with sluggish inquiry for the low silicon grades.

Cold-finished spring steel strip

prices are being adjusted upward, as much as $6 a ton on the 0.41 to 0.60 per cent carbon grade.

Steel Bars . . .

Bar Prices, Page 141

Commercial steel bar demand lags. Most producers' second quarter books have been open two or three weeks, but they have considerable open space in their schedules. But Chicago area sellers say second quarter sales prospects are promising. There will be relatively little carry-over at the end of this quarter.

Consumption is active. Producers think it will continue so through the second quarter. Still, demand will not press capacity. Auto builders and other users are letting their inventories decline.

Only in the large rounds and flats is any supply stringency noted. Even here, demand appears less pressing.

Eastern cold-drawn bar mills are increasing extras on the carbon and alloy grades in line with recent changes by the larger integrated producers.

A wildcat strike at Republic Steel's bar mill in Buffalo, shut down the 8, 10 and 14 in. mills. Some 550 men were idled, but steel production was not affected.

Tubular Goods . . .

Tubular Goods Prices, Page 147

Joining the list of producers to announce increases in pipe prices are Kaiser Steel Corp., Oakland, Calif., Lone Star Steel Co., Dallas, Republic Steel Corp., Cleveland, Wheatland Tube Co., Laclede Steel Co., and Bethlehem Steel Co.

U.S. Steel Export Co., New York, increased prices on pipe and various wire products for export in line with changes recently effected in the domestic market. The new prices went into effect Feb. 13, and include freight to New York, Philadelphia and Baltimore.

While the tubular goods market is experiencing strong demand over-all, buttweld pipe—the type widely used in construction—is close to normal, with deliveries running approximately three weeks from some mills. Seamless pipe is booked up solidly through this quarter, deliveries on most sizes ranging 30 to 45 days.

While line pipe is reported sold out through 1959 (order books were recently opened for 1960) oil country goods producers, notably at Pittsburgh, report incoming second quarter orders are not as heavy as had been expected. Pick-up in specifying is anticipated shortly. Expectations are that some 1900 more wells will be drilled this year than in 1956.

Sales of specialty tubing are good, though firms specializing in mechanical tubing for the auto makers report lagging demand.

Cast iron pipe sales agencies anticipate active demand come spring. Mill backlogs are reported to be large, but deliveries, as a rule, are prompt.

Pacific Gas & Electric Co. plans a superinch gas transmission line between San Bernardino county, Calif., and Milpitas, Calif.

Semifinished Steel . . .

Semifinished Prices, Page 141

Steel production continues to be hampered by a shortage of oxygen

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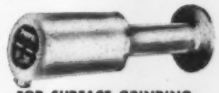

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brought about by a strike at Linde Air Products Co. plants. Fabricating plants also are handicapped. From Youngstown comes the report that if the strike continues much longer it may force curtailment at some shops. Oxygen supplies at some firms have been cut to 25 per cent of normal.

Use of oxygen in the steel mills has been reduced generally for such work as maintenance, scrap cutting, ingot scarfing and billet cutting, lancing skulls, etc.

Plates . . .

Plate Prices, Page 141

Lukens Steel Co. plans a $1-million steel plate testing laboratory at Coatesville, Pa. Construction is scheduled for completion by the end of the year.

Plate specification is well in excess of supplies. Light plate supply is easier due to increasing tonnage from the strip-sheet mills. But offerings fall short of consumer needs. A Pittsburgh area user says only plates up to ¼-in. are in good supply. Sizes ¼ to ½-in. are improving in supply, but are still tight. All larger sizes must be ordered three months in advance of delivery.

Producers and consumers doubt that a balance between supply and demand will be struck this year. A Chicago area mill that does conversion of plates and structurals is booked to capacity through the first half and thinks this condition will prevail the entire year.

In New England, fabricators expected to run short of wide plate, ½-in. and heavier, in the second quarter. Specialties and higher quality grades are just as tight in the area, and some power plant expansion is being delayed for lack of plates as well as seamless tubing. Tank shops are getting light plates in larger volume and are stepping up operations.

Ferroalloy Prices

FERROALLOY quotations remain unchanged. The current price schedule was published in full on page 246 of the Feb. 18 issue of STEEL.

Wire . . .

Wire Prices, Pages 143 & 144

Merchant wire products demand is noticeably improved. This is a seasonal development, and it follows a long period of relative sluggish buying.

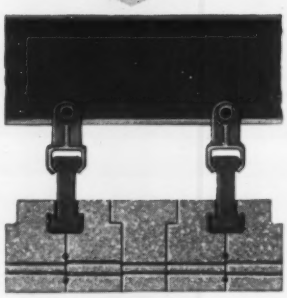
Order volume is reported rising rapidly at Pittsburgh. One producer there says its unfilled orders for such items as fence are 50 per cent ahead of the level of a month ago.

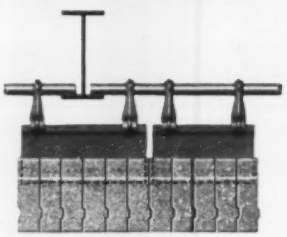
Second quarter shipments will show a substantial rise over first quarter tonnage, including barbed wire and nails.

Manufacturers wire continues to move slowly. Users' inventories appear ample. Spring and heading wire orders are sluggish for the second quarter, and March schedules are not filled for numerous carbon grades.

Screw and fastener producers are caught in a price squeeze, with higher wire costs difficult to pass on—notably on automotive supply

This tile is called a dog bone!





It's a husky supporting tile—used instead of an expensive alloy casting in a double suspended arch designed by B-L for high temperature aluminum, steel and glass furnaces. It can stand extremely high temperatures—can be used with or without insulation.

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contracts. Through extras, the average price increase on most carbon grades runs up to $7 a ton, more for specialties. Some cold-heading grades formerly taking two extras now have seven and more. Rods, including size, annealing and chemical extras, are up $8.50 on the average.

Structural Shapes . . .

Structural Shape Prices, Page 141

There is a large volume of work on architects' boards, but little new structural work is coming out. Here and there a cancellation or a deferment is noted.

These developments are due to the tight money situation and a disposition of builders to take a second look at the business picture. As a result, a slight easing in structural backlogs is seen. Fabricators are somewhat less selective in bidding. In general, though, they still hold heavy order books, and they are still wrestling with short steel supply.

It is estimated the fabricators will produce close to 3.8 million tons in 1957, against 3.2 million in 1956.

An outstanding job in prospect at New York is a 30-story office building for Uris Bros., 2 Broadway, requiring 15,000 tons of structurals.

The low estimate on welded steel girders for a five-span bridge superstructure, Farmington river, Windsor, Conn., was 26.8 cents per pound, 1030 tons; for composite beam bridges, 960 tons, the low was 17.6 cents per pound in place.

Warehouse . . .

Warehouse Prices, Page 148

Distributors in the Mid-Atlantic district are returning to a single base for hot-rolled carbon bars. This policy is expected to be adapted by most sellers in all districts.

In Philadelphia, they now quote $8.71 per 100 lb, f.o.b. warehouse, and add 50 cents for special quality, instead of quoting a separate base. This will throw "quality" in with other extras, some of which are being revised. It will eliminate confusion arising from two base prices on hot-rolled carbon bars which were put into effect early last year.

For hot-rolled special quality and cold-finished bars, New England distributors are going to multiple pricing, based on size range, additional extras and markup.

Bookings have not increased this month as some sellers had anticipated. Renewed interest is noted, however, in wire and fasteners used in farm maintenance. Demand also is increasing from construction firms.

Consumers of bars and sheets are reducing inventories. At the same time, they are trying to increase stocks of shapes and plates.

Pig Iron . . .

Pig Iron Prices, Page 148

Despite spotty demand, talk of a probable pig iron price increase is spreading throughout the trade. Reason: Rising costs, including the recent rise in the price of iron ore.

Automotive foundries and jobbing shops are buying sparingly. Most cast pipe shops are buying lightly. Foundries making castings for the major appliance industries report some slowup in

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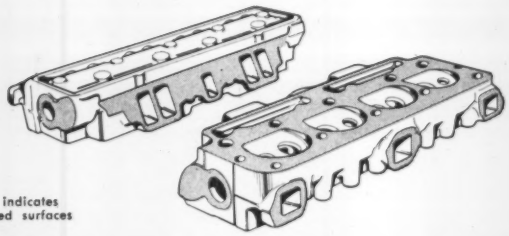

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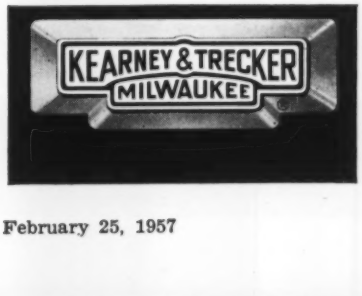

operations. Those producing for farm implement makers are getting a little busier. Foundries making railroad equipment are operating at high levels.

Consumers of merchant basic iron are buying actively, reflecting high operations at most steel foundries and steel mills.

Iron Ore . . .

Iron Ore Prices, Page 149

Stocks of iron ore on hand Dec. 31, 1956 totaled 58,187,162 gross tons, reports the Lake Superior Iron Ore Association. This was a drop of 5,556,977 tons from the 63,744,139 tons held Nov. 30.

Of stocks at the beginning of this year, 43,441,249 tons were U.S. Lake Superior ores; 3,038,407 tons, other U.S. ores; 2,066,486 tons, Canadian Lake Superior ores; 5,020,639 tons, other Canadian ores; 4,620,381 tons, other foreign ores.

Iron ore consumption in December amounted to 12,049,352 tons, broken down as follows: 7,471,-982 tons, U.S. Lake Superior ores; 1,587,842 tons, other U.S. ores; 367,907 tons, Canadian Lake Superior ores; 868,081 tons, other Canadian ores; 1,753,540 tons, other foreign ores.

Consumption in all of last year totaled 125,503,912 tons, of which 119,669,641 tons were consumed in the U.S. and 5,834,271 tons in Canada. Of the total consumption, 79,270,544 tons were U.S. Lake Superior ores; 18,417,252 tons, other U.S. ores; 3,619,715 tons, Canadian Lake Superior ores; 7,874,291 tons, other Canadian ores; 16,322,-110 tons, other foreign ores.

Active blast furnaces at the end of December numbered 259, of which 246 were U.S. stacks, 13 Canadian. Only 11 furnaces in the U.S. and three in Canada were reported idle.

January Steel Record Set

January production of 11,001,000 net tons of ingot and steel for castings was a record for the month. Output marked the second time in history monthly production reached 11 million tons.

At the January production rate, the industry's steelmaking furnaces were within about 3 hours operating time of exceeding the record 11,048,513 net tons produced during October, 1956, reports the American Iron & Steel Institute.

The January total compares with 10,837,545 tons in December, with 10,828,231 tons in January, 1956.

The institute's preliminary figures show the steelmaking furnaces operated at 97.1 per cent of capacity during January. That figure is based on rated annual capacity of 133,459,150 net tons as of Jan. 1, 1957.

The index of production (1947-1949 equals 100) was 154.6 during the month, against 152.3 in December and 155.3 in the record month of October last year. The index during the full year 1956 was 137.2.

Steel Ingot Production—January, 1957

Period	—OPEN HEARTH— Net tons	Per cent of capacity	—BESSEMER— Net tons	Per cent of capacity	—ELECTRIC— Net tons	Per cent of capacity	—TOTAL— Net tons	Per cent of capacity
1957								
†January	9,828,000	99.0	295,000	77.1	878,000	85.8	11,001,000	97.1
1956								
January	9,676,151	101.4	323,235	79.5	828,845	86.7	10,828,231	99.3
February	9,043,064	101.3	296,543	78.0	779,388	87.1	10,118,995	99.2
March	9,795,263	102.7	310,060	76.3	819,465	85.7	10,924,788	100.2
1st Qtr.	28,514,478	101.8	929,838	77.9	2,427,698	86.5	31,872,014	99.6
April	9,437,945	102.2	306,388	77.9	779,452	84.2	10,523,785	99.7
May	9,370,167	98.2	297,990	73.3	822,219	86.0	10,490,376	96.2
June	8,665,044	93.9	282,846	71.9	773,546	83.6	9,721,436	92.1
2nd Qtr.	27,473,156	98.1	887,224	74.3	2,375,217	84.6	30,735,597	96.0
1st 6 Mo.	55,987,634	100.0	1,817,062	76.1	4,802,915	85.6	62,607,611	97.8
July	1,330,151	13.9	.....	....	292,012	30.5	1,622,163	14.9
August	7,213,274	75.6	189,564	46.6	719,759	75.3	8,122,597	74.5
September	9,342,796	101.2	286,978	72.9	792,885	85.7	10,422,659	98.8
3rd Qtr.	17,886,221	63.2	476,542	39.5	1,804,656	63.6	20,167,419	62.3
9 Mo.	73,873,416	87.6	2,293,604	63.8	6,607,571	78.2	82,774,591	85.9
October	9,841,002	103.2	330,101	81.2	877,410	91.8	11,048,513	101.3
November	9,430,248	102.2	295,827	75.2	829,425	89.6	10,555,500	100.0
*December	9,695,919	101.6	308,465	75.9	833,161	87.1	10,837,545	99.4
*4th Qtr.	28,967,169	102.3	934,393	77.4	2,539,996	89.5	32,441,558	100.3
2d 6 Mo.	46,853,390	82.8	1,410,935	58.5	4,344,652	76.5	52,608,977	81.3
*Total 1956	102,840,585	91.6	3,227,997	67.4	9,147,567	81.2	115,216,149	89.8

Note—The percentages of capacity operated are calculated on annual capacities as of Jan. 1, 1956, as follows: Open hearth 112,317,040 net tons, bessemer 4,787,000 net tons, electric 11,259,050 net tons, total 128,363,090 net tons.

Note—The percentages of capacity operated are calculated on annual capacities as of Jan. 1, 1957, as follows: Open hearth 116,912,410 net tons, bessemer 4,505,000 net tons, electric 12,041,740 net tons, total 133,459,150 net tons.

*Revised. †Preliminary figures subject to revision.

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STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

1400 tons, Brandywine Junior High School, near Coatesville, Pa., to the Belmont Iron Works, Eddystone, Pa.; includes 450 tons of bar joists.

1000 tons or more, social center, Air Force Academy, Colorado Springs, Colo., to Havens Structural Steel Co., Kansas City, Mo., low at $328,191, by the Air Force Construction Agency.

233 tons, state bridge, Camden county, N. J., through Public Constructors Inc., Pleasantville, N. J., general contractor, to the Bethlehem Steel Co., Bethlehem, Pa.

STRUCTURAL STEEL PENDING

15,000 tons, Uris Bros. office building, 30 stories, involving 1,300,000 sq ft, 2 Broadway, New York; Emery & Roth, architect; completion in January, 1959.

725 tons, five state bridges, Lehigh county, Pa.; low bid on general contract submitted by S. J. Groves & Sons, Woodbridge, N. J., rejected as too high.

430 tons, six-span composite beam bridge, Quinebaug river, Brooklyn-Plainfield, Conn.; Halloran Construction Co., Providence, R. I., low on general contract.

400 tons, Seattle City Light Department, north service center; general contract to Sellen & Hansen, Seattle, low at $1,115,350.

280 tons, pedestrian bridge, Boeing Airplane plant No. 2, Seattle; Manson Construction & Engineering Co., Seattle, low at $574,000.

200 tons, seven transmission towers involving four different types, for the Barnhart-Plattsburg transmission project; bids to be opened Mar. 7 by the New York State Power Authority, 270 Broadway, New York.

180 tons, two-span rolled beam bridge, Newton, Conn.; Frouge Construction Co., Bridgeport, Conn., low; also 170 tons, deformed reinforcing bars.

180 tons, Idaho state underpass, Idaho Falls; bids to Boise, Idaho, Feb. 26.

100 tons or more, four bulkhead gates, guides, seats, etc., Helena Valley pumping plant, Montana; Missouri Basin project; bids to the Bureau of Reclamation, Denver, March 14.

REINFORCING BARS . . .

REINFORCING BARS PLACED

150 tons, Larson Air Base hospital, Washington state, to Bethlehem Pacific Coast Steel Corp., Seattle; James I. Barnes Construction Co., Seattle, general contractor.

104 tons, junior college, Everett, Wash., to Bethlehem Pacific Coast Steel Corp., Seattle; general contract to George E. Teufel Co., Seattle, low at $1,183,500.

100 tons, including structurals, school, Ayer, Mass., to Joseph T. Ryerson & Son Inc., Boston; J. F. Rand & Son, Boston, general contractor; structurals, Hub Steel & Iron Works, Boston.

Unstated, two structures, storage and operating for the Great Western Malting Co., Vancouver, Wash., to unstated interests; Henry George & Sons, Spokane, Wash., general contractor.

REINFORCING BARS PENDING

325 tons, Helena Valley project, Canyon Ferry, Mont.; rebids to Bureau of Reclamation, Feb. 26.

250 tons, plus concrete pipe, siphon and additional metal work, Helena Valley project dam; bids to the Bureau of Reclamation, Helena, Mont., Feb. 26.

110 tons, Idaho state underpass, Idaho Falls; bids to Boise, Idaho, Feb. 26.

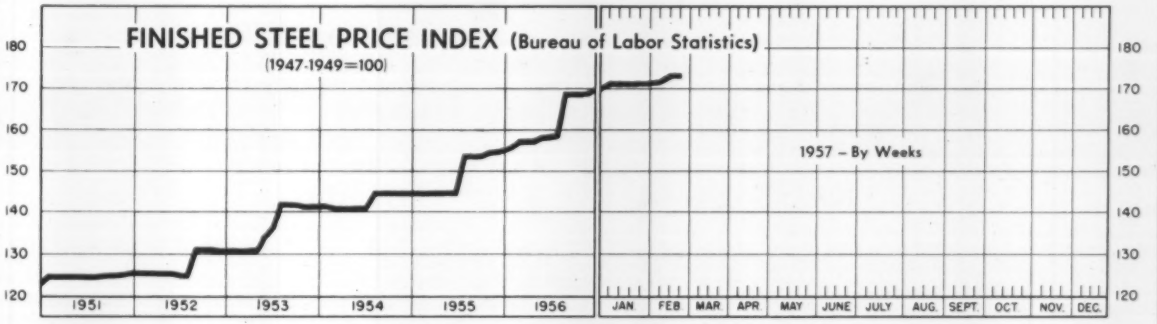
100 tons or more, Idaho state highway bridge, Adams and Idaho counties; general contract to Earl L. McNutt, Eugene, Oreg., low at $449,938.

100 tons or more, Idaho state two-bridge highway project, Bannock county; general contract to Carl E. Nelson Construction Co., Logan, Utah, low at $516,488.

125 tons, Raging river bridge, bids to King county, Wash.; Seattle, Feb. 25.

100 tons, including shapes (lump sum) and miscellaneous, Washington state approach to Tacoma's 11th street bridge; bids to Oympia, Wash., March 12.

Price Indexes and Composites



Feb. 19, 1957	Week Ago	Month Ago	Jan. Avg.	Year Ago
173.4	173.0	171.6	171.1	157.1

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Feb. 19

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard, No. 1	$5.150
Rails, Light, 40 lb	6.567
Tie Plates	6.025
Axles, Railway	9.317
Wheels, Freight Car, 33 in. (per wheel)	57.50
Plates, Carbon	5.900
Structural Shapes	5.667
Bars, Tool Steel, Carbon (lb)	0.480
Bars, Tool Steel Alloy, Oil Hardening Die (lb)	0.585
Bars, Tool Steel, H.R., Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.274
Bars, Tool Steel, H.R., Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.769
Bars, H.R., Alloy	10.150
Bars, H.R., Stainless, 303 (lb)	0.508
Bars, H.R., Carbon	6.075
Bars, Reinforcing	5.788
Bars, C.F., Carbon	9.790
Bars, C.F., Alloy	13.388
Bars, C.F., Stainless, 302 (lb)	0.533
Sheets, H.R., Carbon	5.945
Sheets, C.R., Carbon	6.789
Sheets, Galvanized	8.220
Sheets, C.R., Stainless, 302 (lb)	0.660
Sheets, Electrical	11.225
Strip, C.R., Carbon	8.843
Strip, C.R., Stainless, 403 (lb)	0.475
Strip, H.R., Carbon	6.000
Pipe, Black, Buttweld (100 ft)	18.894
Pipe, Galv, Buttweld (100 ft)	23.034
Pipe, Line (100 ft)	190.108
Casing, Oil Well, Carbon (100 ft)	185.566
Casing, Oil Well, Alloy (100 ft)	284.943
Tubes, Boiler (100 ft)	45.670
Tubing, Mechanical, Carbon (100 ft)	23.367
Tubing, Mechanical, Stainless, 304 (100 ft)	197.663
Tin Plate, Hot-dipped, 1.25 lb	9.433
Tin Plate, Electrolytic, 0.25 lb	8.133
Black Plate, Canmaking Quality	7.233
Wire, Drawn, Carbon	9.475
Wire, Drawn, Stainless, 430 (lb)	0.630
Bale Ties (bundle)	7.213
Nails, Wire, 8d Common	9.365
Wire, Barbed (80-rod spool)	8.412
Woven Wire Fence (20-rod roll)	20.505

STEEL's FINISHED STEEL PRICE INDEX*

	Feb. 20 1957	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	227.10	227.10†	225.92	209.10	171.92
Index in cents per lb	6.152	6.152†	6.111	5.665	4.657

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel NT*	$139.60	$139.60†	$137.98	$127.91	$106.32
No. 2 Fdry Pig Iron, GT	62.63	62.63	62.63	58.99	52.54
Basic Pig Iron, GT	62.18	62.18	62.18	58.49	52.16
Malleable Pig Iron, GT	63.41	63.41	63.41	59.77	53.27
Steelmaking Scrap, GT	52.83	53.17	59.17	48.33	43.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130. †Revised.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Feb. 20 1957	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	5.075	5.075	5.075	4.65	3.70
Bars, H.R., Chicago	5.075	5.075	5.075	4.65	3.70
Bars, H.R., deld., Philadelphia	5.365	5.365	5.365	4.90	4.223
Bars, C.F., Pittsburgh	6.85*	6.85*	6.85*	6.25*	4.55
Shapes, Std., Pittsburgh	5.00	5.00	5.00	4.60	3.65
Shapes, Std., Chicago	5.00	5.00	5.00	4.60	3.65
Shapes, deld., Philadelphia	5.31	5.31	5.31	4.88	3.918
Plates, Pittsburgh	4.85	4.85	4.85	4.50	3.70
Plates, Chicago	4.85	4.85	4.85	4.50	3.70
Plates, Coatesville, Pa.	5.25	5.25	5.25	4.80	4.15
Plates, Sparrows Point, Md.	4.85	4.85	4.85	4.50	3.70
Plates, Claymont, Del.	5.70	5.70	5.70	4.80	4.15
Sheets, H.R., Pittsburgh	4.675	4.675	4.675	4.325	3.60-3.75
Sheets, H.R., Chicago	4.675	4.675	4.675	4.325	3.60
Sheets, C.R., Pittsburgh	5.75	5.75	5.75	5.325	4.35
Sheets, C.R., Chicago	5.75	5.75	5.75	5.325	4.35
Sheets, C.R., Detroit	5.75-5.85	5.75-5.85	5.75-5.85	5.325-5.425	4.55
Sheets, Galv., Pittsburgh	6.30	6.30	6.30	5.85	4.80
Strip, H.R., Pittsburgh	4.675	4.675	4.675	4.325	3.75-4.00
Strip, H.R., Chicago	4.675	4.675	4.675	4.325	3.50
Strip, C.R., Pittsburgh	6.85	6.85	6.85	6.25	4.65-5.35
Strip, C.R., Chicago	6.85	6.85	6.85	6.25-6.35	4.90
Strip, C.R., Detroit	6.95	6.95	6.95	6.35	4.85-5.60
Wire, Basic, Pittsburgh	7.20	7.20	7.20	6.60	4.85-5.10
Nails, Wire, Pittsburgh	8.49	8.49	8.49	7.60	5.90-6.20
Tin plate (1.50 lb), box, Pitts.	$9.95	$9.95	$9.95	$9.45	$8.70

*Including 0.35c for special quality

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$91.50	$91.50	$91.50	$84.50	$66.00
Wire rods, $\frac{7}{32}$-$\frac{9}{16}$" Pitts.	5.80	5.80	5.80	5.375	4.10-4.30

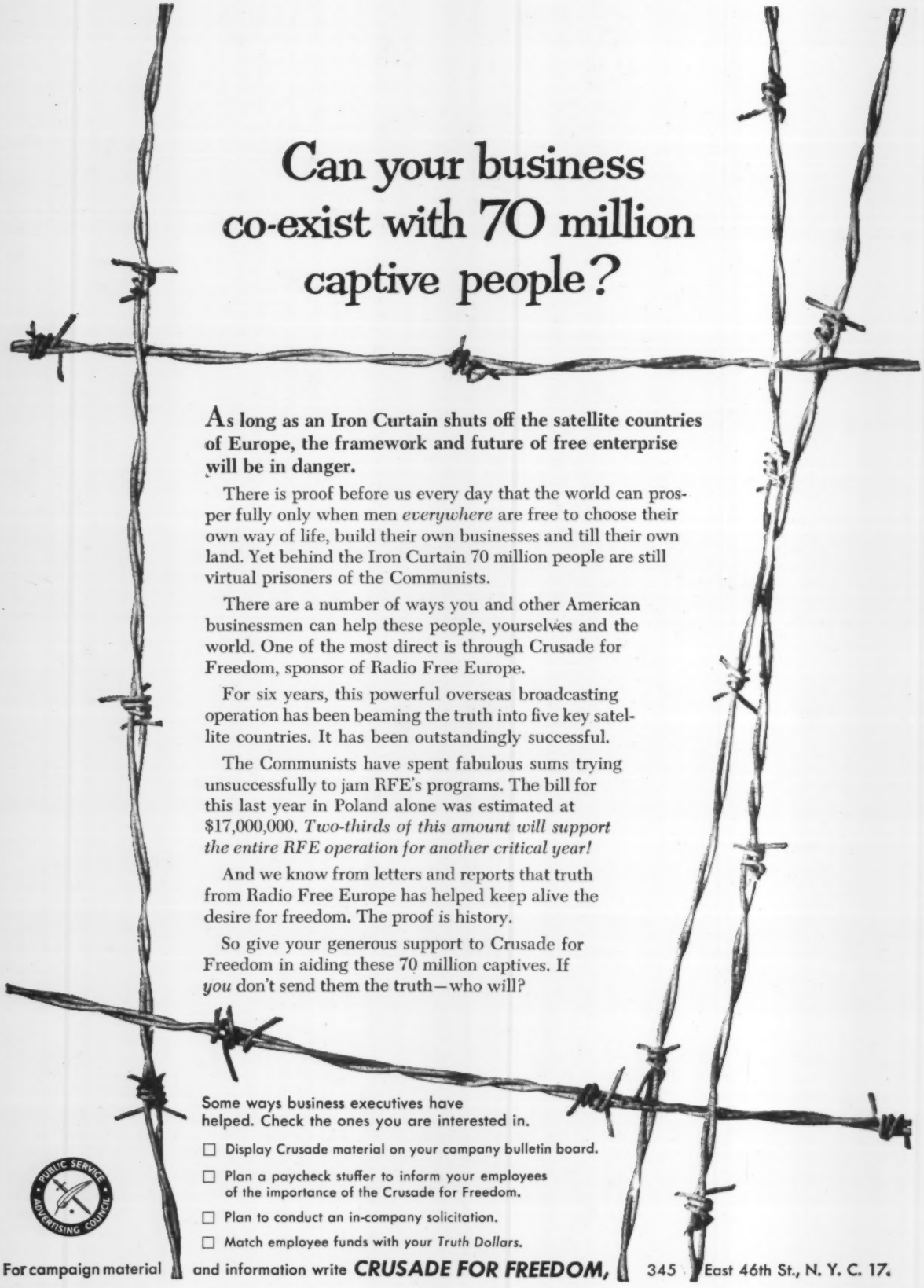
PIG IRON, Gross Ton	Feb. 20 1957	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bessemer, Pitts.	$63.50	$63.50	$63.50	$59.50	$53.00
Basic, Valley	62.50	62.50	62.50	58.50	52.00
Basic, deld., Phila.	66.26	66.26	66.26	62.16	56.61
No. 2 Fdry, NevilleIsland, Pa.	63.00	63.00	63.00	59.00	52.50
No. 2 Fdry, Chicago	63.00	63.00	63.00	59.00	52.50
No. 2 Fdry, deld., Phila.	66.76	66.76	66.76	62.66	57.11
No. 2 Fdry, Birm.	59.00	59.00	59.00	55.00	48.88
No. 2 Fdry (Birm.) deld. Cin.	66.70	66.70	66.70	62.70	55.49
Malleable, Valley	63.00	63.00	63.00	59.00	52.50
Malleable, Chicago	63.00	63.00	63.00	59.00	52.50
Ferromanganese, Duquesne	255.00†	255.00†	255.00†	205.00†	188.00*

†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$53.50	$53.50	$61.50	$49.00	$44.00
No. 1 Heavy Melt, E. Pa.	57.00	58.00	59.00	51.00	42.50
No. 1 Heavy Melt, Chicago	48.00	48.00	57.00	47.00	42.50
No. 1 Heavy Melt, Valley	53.50	53.50	63.50	52.50	44.00
No. 1 Heavy Melt, Cleve.	51.50	51.50	60.50	49.50	43.00
No. 1 Heavy Melt, Buffalo	53.50	53.50	61.50	46.50	43.00
Rails, Rerolling, Chicago	64.50	64.50	72.50	66.00	52.50
No. 1 Cast, Chicago	45.50	45.50	48.50	46.50	49.00

COKE, Net Ton					
Index (1935-39 av.=100)	227.10	227.10†	225.92	209.10	171.92
Index in cents per lb	6.152	6.152†	6.111	5.665	4.657

Can your business co-exist with 70 million captive people?



As long as an Iron Curtain shuts off the satellite countries of Europe, the framework and future of free enterprise will be in danger.

There is proof before us every day that the world can prosper fully only when men *everywhere* are free to choose their own way of life, build their own businesses and till their own land. Yet behind the Iron Curtain 70 million people are still virtual prisoners of the Communists.

There are a number of ways you and other American businessmen can help these people, yourselves and the world. One of the most direct is through Crusade for Freedom, sponsor of Radio Free Europe.

For six years, this powerful overseas broadcasting operation has been beaming the truth into five key satellite countries. It has been outstandingly successful.

The Communists have spent fabulous sums trying unsuccessfully to jam RFE's programs. The bill for this last year in Poland alone was estimated at $17,000,000. *Two-thirds of this amount will support the entire RFE operation for another critical year!*

And we know from letters and reports that truth from Radio Free Europe has helped keep alive the desire for freedom. The proof is history.

So give your generous support to Crusade for Freedom in aiding these 70 million captives. If *you* don't send them the truth—who will?

Some ways business executives have helped. Check the ones you are interested in.

- ☐ Display Crusade material on your company bulletin board.
- ☐ Plan a paycheck stuffer to inform your employees of the importance of the Crusade for Freedom.
- ☐ Plan to conduct an in-company solicitation.
- ☐ Match employee funds with *your Truth Dollars.*

PUBLIC SERVICE ADVERTISING COUNCIL

For campaign material and information write **CRUSADE FOR FREEDOM,** 345 East 46th St., N. Y. C. 17.

Steel Prices

Mill prices as reported to STEEL, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key to producers, page 142; to footnotes, page 144.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5 .....$70.50

INGOTS, Alloy (NT)

Detroit R7 .....$74.00
Houston S5 .....74.00
Midland,Pa. C18 .....74.00
Munhall,Pa. U5 .....74.00

BILLETS, BLOOMS & SLABS Carbon, Rerolling (NT)

Bessemer,Pa. U5 .....$74.00
Bridgeport,Conn. N19 ..79.00
Buffalo R2 .....74.00
Clairton,Pa. U5 .....74.00
Ensley,Ala. T2 .....74.00
Fairfield,Ala. T2 .....74.00
Fontana,Calif. K1 ....83.50
Gary,Ind. U5 .....74.00
Johnstown,Pa. B2 ....74.00
Lackawanna,N.Y. B2 ..74.00
LoneStar,Tex. L6 ....80.00
Munhall,Pa. U5 .....74.00
S.Chicago,Ill. R2, U5..74.00
S.Duquesne,Pa. U5 ....74.00
Sterling,Ill. N15 .....74.00
Youngstown R2 .....74.00

Carbon, Forging (NT)

Bessemer,Pa. U5 .....$91.50
Bridgeport,Conn. N19 ..96.50
Buffalo R2 .....91.50
Canton,O. R2 .....94.00
Clairton,Pa. U5 .....91.50
Conshohocken,Pa. A3 ..96.50
Ensley,Ala. T2 .....91.50
Fairfield,Ala. T2 .....91.50
Fontana,Calif. K1 ....101.00
Gary,Ind. U5 .....91.50
Geneva,Utah C11 .....91.50
Houston S5 .....96.50
Johnstown,Pa. B2 ....91.50
Lackawanna,N.Y. B2 ..91.50
LosAngeles B3 .....101.00
Midland,Pa. C18 .....91.50
Munhall,Pa. U5 .....91.50
Seattle B3 .....105.00
S.Chicago R2, U5, W14 91.50
S.Duquesne,Pa. U5 ....91.50
S.SanFrancisco B3 ....101.00

Alloy, Forging (NT)

Bethlehem,Pa. B2 ...$107.00
Bridgeport,Conn. N19, 107.00
Buffalo R2 .....107.00
Canton,O. R2 .....107.00
Conshohocken,Pa. A3 .114.00
Detroit R7 .....107.00
Fontana,Calif. K1 ....128.00
Gary,Ind. U5 .....107.00
Houston S5 .....112.00
Ind.Harbor,Ind. Y1 ..107.00
Johnstown,Pa. B2 ....107.00
Lackawanna,N.Y. B2 .107.00
LosAngeles B3 .....127.00
Massillon,O. R2 .....107.00
Midland,Pa. C18 .....107.00
Munhall,Pa. U5 .....107.00
S.Chicago R2,U5,W14 .107.00
S.Duquesne,Pa. U5 ....107.00
Struthers,O. Y1 .....107.00
Warren,O. C17 .....107.00

ROUNDS, SEAMLESS TUBE (NT)

Bridgeport,Conn. N19 $116.50
Buffalo R2 .....111.50
Canton,O. R2 .....114.00
Cleveland,O. R2 .....111.50
Gary,Ind. U5 .....111.50
S.Chicago,Ill. R2, W14..111.50
S.Duquesne,Pa. U5 ....111.50

SKELP

Aliquippa,Pa. J5 .....4.725
LoneStar,Tex. L6 .....5.025
Munhall,Pa. U5 .....4.625
Warren,O. R2 .....4.625
Youngstown R2, U5 ...4.625

WIRE RODS

AlabamaCity,Ala. R2 ...5.80
Aliquippa,Pa. J5 .....5.80
Alton,Ill. L1 .....6.00
Buffalo W12 .....5.80
Cleveland A7 .....5.80
Donora,Pa. A7 .....5.80
Fairfield,Ala. T2 .....5.80
Houston S5 .....6.05
IndianaHarbor,Ind. Y1..5.80
Johnstown,Pa. B2 .....5.80
Joliet,Ill. A7 .....5.80
KansasCity,Mo. S5 ....6.05
Kokomo,Ind. C16 .....5.90
LosAngeles B3 .....6.60
Minnequa,Colo. C10 ....6.05
Monessen,Pa. P7 .....5.80
N.Tonawanda,N.Y. B11.5.80
Pittsburg,Calif. C11 .....6.60
Portsmouth,O. P12 .....5.80
Roebling,N.J. R5 .....5.90
S.Chicago,Ill. R2 .....5.80
SparrowsPoint,Md. B2 ..5.90
Sterling,Ill.(1) N15 ....5.80
Sterling,Ill. N15 .....5.90
Struthers,O. Y1 .....5.80
Worcester,Mass. A7 ....6.10

STRUCTURALS

Carbon Steel Std. Shapes

Ala.City,Ala. R2 .....5.00
Aliquippa,Pa. J5 .....5.00
Bessemer,Ala. T2 .....5.00
Bethlehem,Pa. B2 .....5.05
Birmingham C15 .....5.25
Clairton,Pa. U5 .....5.00
Fairfield,Ala. T2 .....5.00
Fontana,Calif. K1 .....5.75
Gary,Ind. U5 .....5.00
Geneva,Utah C11 .....5.00
Houston S5 .....5.10
Ind.Harbor,Ind. I-2 ....5.00
Johnstown,Pa. B2 .....5.05
Joliet,Ill. P22 .....5.50
KansasCity,Mo. S5 .....5.10
Lackawanna,N.Y. B2 ...5.05
LosAngeles B3 .....5.70
Minnequa,Colo. C10 ....5.30
Munhall,Pa. U5 .....5.00
Niles,Calif. P1 .....5.75
Phoenixville,Pa. P4 ....5.85
Portland,Oreg. O4 .....5.80
Seattle B3 .....5.75
S.Chicago,Ill. U5, W14..5.00
S.SanFrancisco B3 .....5.65
Sterling,Ill. N15 .....5.00
Torrance,Calif. C11 ....5.70
Weirton,W.Va. W6 .....5.00

Wide Flange

Bethlehem,Pa. B2 .....5.05
Clairton,Pa. U5 .....5.00
Fontana,Calif. K1 .....5.90
IndianaHarbor,Ind. I-2..5.25
Lackawanna,N.Y. B2 ...5.05
Munhall,Pa. U5 .....5.00
Phoenixville,Pa. P4 ....5.85
S.Chicago,Ill. U5 .....5.00

Alloy Std. Shapes

Aliquippa,Pa. J5 .....6.20
Clairton,Pa. U5 .....6.20
Gary,Ind. U5 .....6.20
Houston S5 .....6.30
Munhall,Pa. U5 .....6.20
S.Chicago,Ill. U5 .....6.20

H.S., L.A. Std. Shapes

Aliquippa,Pa. J5 .....7.35
Bessemer,Ala. T2 .....7.35
Bethlehem,Pa. B2 .....7.40
Clairton,Pa. U5 .....7.35
Fairfield,Ala. T2 .....7.35
Fontana,Calif. K1 .....8.10
Gary,Ind. U5 .....7.35
Geneva,Utah C11 .....7.35
Houston S5 .....7.45
Ind.Harbor,Ind. I-2, Y1..7.35
Johnstown,Pa. B2 .....7.40
KansasCity,Mo. S5 .....7.45
Lackawanna,N.Y. B2 ...7.40
LosAngeles B3 .....8.05
Munhall,Pa. U5 .....7.35
Seattle B3 .....8.10
S.Chicago,Ill. U5, W14..7.35
S.SanFrancisco B3 .....8.00
Struthers,O. Y1 .....7.35

H.S., L.A. Wide Flange

Bethlehem,Pa. B2 .....7.40
Lackawanna,N.Y. B2 ...7.40
Munhall,Pa. U5 .....7.35
S.Chicago,Ill. U5 .....7.35

PILING

BEARING PILES

Bethlehem,Pa. B2 .....5.05
Lackawanna,N.Y. B2 ...5.05
Munhall,Pa. U5 .....5.00
S.Chicago,Ill. U5 .....5.00

STEEL SHEET PILING

Lackawanna,N.Y. B2 ...5.90
Munhall,Pa. U5 .....5.90
S.Chicago,Ill. U5 .....5.90

PLATES

PLATES, Carbon Steel

Ala.City,Ala. R2 .....4.85
Aliquippa,Pa. J5 .....4.85
Ashland,Ky.(15) A10 ...4.85
Bessemer,Ala. T2 .....4.85
Bridgeport,Conn. N19 ..4.75
Clairton,Pa. U5 .....4.85
Claymont,Del. C22 .....5.70
Cleveland J5, R2 .....4.95
Coatesville,Pa. L7 .....5.25
Conshohocken,Pa. A3 ...4.95
Detroit M1 .....4.95
Ecorse,Mich. G5 .....4.95
Fairfield,Ala. T2 .....4.85
Fontana,Calif.(30) K1 ..5.60
Gary,Ind. U5 .....4.85
Geneva,Utah C11 .....4.85
GraniteCity,Ill. G4 .....5.05
Harrisburg,Pa. P4 .....5.80
Houston S5 .....4.95
Ind.Harbor,Ind. I-2, Y1.4.85
Johnstown,Pa. B2 .....4.85
Lackawanna,N.Y. B2 ...4.85
LoneStar,Tex. L6 .....5.20
Minnequa,Colo. C10 ....5.70
Munhall,Pa. U5 .....4.85
Newport,Ky. A2 .....4.85
Pittsburgh J5 .....4.85
Riverdale,Ill. A1 .....4.85
Seattle B3 .....5.75
Sharon,Pa. S3 .....4.85
S.Chicago,Ill. U5, W14..4.85
SparrowsPoint,Md. B2 ..4.85
Steubenville,O. W10 ....4.85
Warren,O. R2 .....4.85
Youngstown R2, U5, Y1.4.85

PLATES, Carbon Abras. Resist.

Claymont,Del. C22 .....6.20
Fontana,Calif. K1 .....6.75
Geneva,Utah C11 .....6.00
Johnstown,Pa. B2 .....5.65
SparrowsPoint,Md. B2 ..5.65

PLATES, Wrought Iron

Economy,Pa. B14 .....11.95

PLATES, H.S., L.A.

Aliquippa,Pa. J5 .....7.25
Bessemer,Ala. T2 .....7.25
Clairton,Pa. U5 .....7.25
Claymont,Del. C22 .....7.55
Cleveland J5, R2 .....7.25
Coatesville,Pa. L7 .....7.55
Conshohocken,Pa. A3 ..7.25
Ecorse,Mich. G5 .....7.35
Fairfield,Ala. T2 .....7.25
Fontana,Calif.(30) K1 ..8.00
Gary,Ind. U5 .....7.25
Geneva,Utah C11 .....7.25
Houston S5 .....7.35
Ind.Harbor,Ind. I-2, Y1.7.25
Johnstown,Pa. B2 .....7.25
Munhall,Pa. U5 .....7.25
Pittsburgh J5 .....7.25
Seattle B3 .....8.15
Sharon,Pa. S3 .....7.25
S.Chicago,Ill. U5, W14..7.25
SparrowsPoint,Md. B2 ..7.25
Warren,O. R2 .....7.25
Youngstown U5, Y1 ....7.25

PLATES, Alloy

Aliquippa,Pa. J5 .....6.85
Bridgeport,Conn. N19 ..6.55
Claymont,Del. C22 .....6.85
Coatesville,Pa. L7 .....6.85
Fontana,Calif.(30) K1 ..7.60
Gary,Ind. U5 .....6.85
Houston S5 .....6.95
Ind.Harbor,Ind. Y1 ....6.85
Johnstown,Pa. B2 .....6.85
Munhall,Pa. U5 .....6.85
Newport,Ky. A2 .....6.85
Pittsburgh J5 .....6.85
Seattle B3 .....7.75
Sharon,Pa. S3 .....6.85
S.Chicago,Ill. U5, W14..6.85
SparrowsPoint,Md. B2 ..6.85
Youngstown Y1 .....6.85

FLOOR PLATES

Cleveland J5 .....5.925
Conshohocken,Pa. A3 ..5.925
Harrisburg,Pa. P4 .....6.275
Ind.Harbor,Ind. I-2 ....5.925
Munhall,Pa. U5 .....5.925
S.Chicago,Ill. U5 .....5.925

PLATES, Ingot Iron

Ashland c.l. (15) A10...5.10
Ashland l.c.l. (15) A10..5.60
Cleveland c.l. R2 .....5.60
Warren,O. c.l. R2 .....5.60

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)

Ala.City,Ala.(9) R2 ...5.075
Aliquippa,Pa.(9) J5 ...5.075
Alton,Ill. L1 .....5.275
Atlanta(9) A11 .....5.575
Bessemer,Ala.(9) T2 ..5.075
Birmingham(9) C15 ...5.325
Bridgeport,Conn. N19 ..5.30
Buffalo(9) R2 .....5.075
Clairton,Pa. U5 .....5.075
Cleveland(9) R2 .....5.075
Ecorse,Mich.(9) G5 ...5.175
Emeryville,Calif. J7 ....5.85
Fairfield,Ala.(9) T2 ..5.075
Fairless,Pa.(9) U5 ....5.225
Fontana,Calif.(9) K1 ..5.775
Gary,Ind.(9) U5 .....5.075
Geneva,Utah(9) C11 ...5.175
Houston(9) S5 .....5.325
Ind.Harbor(9) I-2, Y1..5.075
Johnstown,Pa.(9) B2 ..5.075
Joliet,Ill. P22 .....5.575
KansasCity,Mo.(9) S5..5.325
Lackawanna(9) B2 .....5.075
LosAngeles(9) B3 .....5.775
Milton,Pa. M18 .....5.225
Minnequa,Colo. C10 ...5.525
Niles,Calif. P1 .....5.85
N.T'wanda,N.Y.(9) B11 5.075
Pittsburg,Calif.(9) C11.5.775
Pittsburgh(9) J5 .....5.075
Portland,Oreg. O4 .....5.85
Seattle B3, N14 .....5.825
S.Ch'c'go(9)R2,U5,W14 5.075
S.Duquesne,Pa.(9) U5 ..5.075
S.SanFran.,Calif.(9) B3 5.825
Sterling,Ill.(1) N15 ....5.075
Sterling,Ill. N15 .....5.175
Struthers,O. Y1 .....5.075
Torrance,Calif.(9) C11.5.775
Youngstown(9) R2, U5 5.075

BARS, H.R. Leaded Alloy (Including leaded extra)

Warren,O. C17 .....7.125

BARS, Hot-Rolled Alloy

Aliquippa,Pa. J5 .....6.125
Bethlehem,Pa. B2 .....6.125
Bridgeport,Conn. N19 ..6.20
Buffalo R2 .....6.125
Canton,O. R2 .....6.125
Clairton,Pa. U5 .....6.125
Detroit R7 .....6.225
Ecorse,Mich. G5 .....6.225
Fairless,Pa. U5 .....6.275
Fontana,Calif. K1 .....7.175
Gary,Ind. U5 .....6.125
Houston S5 .....6.375
Ind.Harbor,Ind. I-2,Y1.6.125
Johnstown,Pa. B2 .....6.125
KansasCity,Mo. S5 .....6.375
Lackawanna,N.Y. B2 ...6.125
LosAngeles B3 .....7.175
Massillon,O. R2 .....6.125
Midland,Pa. C18 .....6.125
Pittsburgh J5 .....6.125
S.Chicago R2,U5,W14 ...6.125
S.Duquesne,Pa. U5 .....6.125
Struthers,O. Y1 .....6.125
Warren,O. C17 .....6.125
Youngstown U5 .....6.125

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy

Aliquippa,Pa. J5 .....7.425
Bessemer,Ala. T2 .....7.425
Bethlehem,Pa. B2 .....7.425
Bridgeport,Conn. N19 ..7.50
Clairton,Pa. U5 .....7.425
Cleveland R2 .....7.425
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.425
Fontana,Calif. K1 .....8.125
Gary,Ind. U5 .....7.425
Houston S5 .....7.675
Ind.Harbor,Ind. Y1 ....7.425
Johnstown,Pa. B2 .....7.425
KansasCity,Mo. S5 .....7.675
Lackawanna,N.Y. B2 ...7.425
LosAngeles B3 .....8.125
Pittsburgh J5 .....7.425
Seattle B3 .....8.175
S.Chicago,Ill. U5, W14..7.425
S.Duquesne,Pa. U5 .....7.425
S.SanFrancisco B3 .....8.175
Struthers,O. Y1 .....7.425
Youngstown U5 .....7.425

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa.(9) B2 ..5.225
Houston S5 .....5.325
KansasCity,Mo. S5 .....5.325
Lackawanna(9) B2 .....5.075
Sterling,Ill. N15 .....5.175
Sterling,Ill.(1) N15 ...5.075

BAR SIZE ANGLES; S. Shapes

Aliquippa,Pa. J5 .....5.075
Atlanta A11 .....5.575
Joliet,Ill. P22 .....5.20
Niles,Calif. P1 .....5.85
Pittsburgh J5 .....5.075
Portland,Oreg. O4 .....5.85
SanFrancisco S7 .....5.95

BAR SHAPES, Hot-Rolled Alloy

Aliquippa,Pa. J5 .....6.20
Clairton,Pa. U5 .....6.20
Gary,Ind. U5 .....6.20
Houston S5 .....6.45
KansasCity,Mo. S5 .....6.45
Pittsburgh J5 .....6.20
Youngstown U5 .....6.20

BARS, C.F. Leaded Alloy (Including leaded extra)

Ambridge,Pa. W18 ....9.475
BeaverFalls,Pa. M12 ..9.475
Chicago W18 .....9.475
Cleveland C20 .....9.475
Los Angeles S30 .....11.10
LosAngeles P2 .....11.35
Monaca,Pa. S17 .....9.475
Newark,N.J. W18 .....9.65
Warren,O. C17 .....9.475

BARS, Cold-Finished Carbon

Ambridge,Pa. W18 ....6.85
BeaverFalls,Pa. M12,R2.6.85
Birmingham C15 .....7.45
Bridgeport,Conn. N19 ...7.20
Buffalo B5 .....6.90
Camden,N.J. P13 .....7.30
Carnegie,Pa. C12 .....6.85
Chicago W18 .....6.85
Cleveland A7, C20 .....6.85
Detroit B5, P17 .....7.05
Detroit R7 .....6.85
Donora,Pa. A7 .....6.85
Elyria,O. W8 .....6.85
FranklinPark,Ill. N5....6.85
Gary,Ind. U5 .....6.85
GreenBay,Wis. F7 .....6.85
Hammond,Ind. L2, M13.6.85
Hartford,Conn. R2 .....7.35
Harvey,Ill. B5 .....6.85
LosAngeles(49) S30 ....8.30
LosAngeles R2 .....8.75
LosAngeles P2 .....8.30
Mansfield,Mass. B5 ....7.40
Massillon,O. R2, R8 ....6.85
Midland,Pa. C18 .....6.85
Monaca,Pa. S17 .....6.85
Newark,N.J. W18 .....7.30
NewCastle,Pa.(17) B4 ..6.85
Pittsburgh J5 .....6.85
Plymouth,Mich. P5 .....7.10
Putnam,Conn. W18 .....7.40
Readville,Mass. C14 ....7.40
S.Chicago,Ill. W14 .....6.85
SpringCity,Pa. K3 .....7.30
Struthers,O. Y1 .....6.85
Waukegan,Ill. A7 .....6.85
Youngstown F3, Y1 ....6.85

BARS, Cold-Finished Carbon (Turned and Ground)

Cumberland,Md.(5) C19.6.10

BARS, Cold-Finished Alloy

Ambridge,Pa. W18 ....8.325
BeaverFalls,Pa.M12,R2 8.325
Bethlehem,Pa. B2 .....8.325
Bridgeport,Conn. N19 ..8.475
Buffalo B5 .....8.325
Camden,N.J. P13 .....8.50
Canton,O. T7 .....8.325
Carnegie,Pa. C12 .....8.325
Chicago W18 .....8.325
Cleveland A7, C20 ....8.325
Detroit B5, P17 .....8.525
Detroit R7 .....8.325
Donora,Pa. A7 .....8.325
Elyria,O. W8 .....8.325
FranklinPark,Ill. N5 ..8.325
Gary,Ind. R2 .....8.325
GreenBay,Wis. F7 .....8.325
Hammond,Ind. L2, M13 8.325
Hartford,Conn. R2 ....8.625
Harvey,Ill. B5 .....8.325
Lackawanna,N.Y. B2 ..8.325
LosAngeles S30 .....10.10
LosAngeles P2 .....10.20
Mansfield,Mass. B5 ....8.625
Massillon,O. R2, R8 ...8.325
Midland,Pa. C18 .....8.325
Monaca,Pa. S17 .....8.325
Newark,N.J. W18 .....8.50
Plymouth,Mich. P5 .....8.525
S.Chicago W14 .....8.325
SpringCity,Pa. K3 .....8.50
Struthers,O. Y1 .....8.325
Warren,O. C17 .....8.325
Waukegan,Ill. A7 .....8.325
Worcester,Mass. A7 ....8.625
Youngstown F3, Y1 ....8.325

BARS, Reinforcing (To Fabricators)

Ala.City,Ala. R2 .....5.075
Atlanta A11 .....5.575
Birmingham C15 .....5.325
Bridgeport,Conn. N19 ..5.30
Buffalo R2 .....5.075
Cleveland R2 .....5.075
Ecorse,Mich. G5 .....5.425
Emeryville,Calif. J7 ....5.85

Fairfield,Ala. T2 .....5.075
Fairless,Pa. U5 .....5.225
Ft.Worth,Tex.(42) T4 .5.525
Gary,Ind. U5 .....5.075
Houston S5 .....5.325
Ind.Harbor,Ind. I-2, Y1 5.075
Johnstown,Pa. B2 ....5.075
Joliet,Ill. P22 .....5.575
KansasCity,Mo. S5 ....5.325
Lackawanna,N.Y. B2 ..5.075
LosAngeles B3 .....5.775
Milton,Pa. M18 .....5.225
Minnequa,Colo. C10 ...5.525
Niles,Calif. P1 .....5.85
Pittsburg,Calif. C11 ..5.775
Pittsburgh J5 .....5.075
Portland,Oreg. O4 ....5.85
SandSprings,Okla. S5 ..5.575
Seattle B3, N14 .....5.825
S.Chicago,Ill. R2 .....5.075
S.Duquesne,Pa. U5 ....5.075
S.SanFrancisco B3 ....5.825
SparrowsPoint,Md. B2..5.075
Sterling Ill.(1) N15 ...5.075
Sterling,Ill. N15 .....5.175
Struthers,O. Y1 .....5.075
Torrance,Calif. C11 ...5.775
Youngstown R2, U5 ...5.075

BARS, Reinforcing (Fabricated; to Consumers)

Chicago U8 .....6.81
Cleveland U8 .....6.79
Johnstown,Pa. ¼-1" B2.6.73
KansasCity,Mo. S5 .....7.00
Marion,O. P11 .....6.70
NewYork U8 .....7.20
Pittsburgh J5, U8 .....6.75
Seattle B3, N14 .....7.20
SparrowsPt. ½-1" B2 ..6.73
Williamsport,Pa. S19 ...6.65

RAIL STEEL BARS

ChicagoHts.(3) C2, I-2.5.075
ChicagoHts.(4) I-2 .....6.10
Chicagolits.(4) C2 .....5.65
Ft.Worth,Tex.(26) T4..5.525
Franklin,Pa.(3) F5 .....5.10
Franklin,Pa.(4) F5 .....6.10
JerseyShore,Pa.(4) J8 ..5.50
Marion,O.(3) P11 .....5.10
Moline,Ill.(3) R2 .....5.225
Tonawanda(3) B12 ....5.65
Tonawanda(4) B12 ....6.15
Williamsport,Pa.(3) S19.5.65

BARS, Wrought Iron

Economy,Pa.(S.R.) B14 13.15
Economy,Pa.(D.R.)B14 16.35
Economy(Staybolt)B14. 16.80
McK.Rks.(S.R.) L5 ...13.15
McK.Rks.(D.R.) L5 ...18.00
McK.Rks.(Staybolt) L5.19.15

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Ala.City,Ala. R2 .....4.675
Allenport,Pa. P7 .....4.675
Ashland,Ky.(8) A10 ..4.675
Cleveland J5, R2 .....4.675
Conshohocken,Pa. A3 ..4.725
Detroit(8) M1 .....4.775
Ecorse,Mich. G5 .....4.775
Fairfield,Ala. T2 .....4.675
Fairless,Pa. U5 .....4.725
Fontana,Calif. K1 ....5.525
Gary,Ind. U5 .....4.675
Geneva,Utah C11 .....4.775
GraniteCity,Ill.(8) G4 ..4.875
Ind.Harbor,Ind. I-2, Y1 4.675
Irvin,Pa. U5 .....4.675
Lackawanna,N.Y. B2 ..4.675
Munhall,Pa. U5 .....4.675
Newport,Ky.(8) A2 ....4.675
Niles,O. M21 .....4.675
Pittsburg,Calif. C11 ....5.375
Pittsburgh J5 .....4.675
Portsmouth,O. P12 .....4.675
Riverdale,Ill. A1 .....4.675
Sharon,Pa. S3 .....4.675
S.Chicago,Ill. W14 ....4.675
SparrowsPoint,Md. B2..4.675
Steubenville,O. W10 ....4.675
Warren,O. R2 .....4.675
Weirton,W.Va. W6 ....4.675
Youngstown U5, Y1 ...4.675

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21 .....5.75

SHEETS, H.R. Alloy

Gary,Ind. U5 .....7.75
Ind.Harbor,Ind. Y1 ....7.75
Irvin,Pa. U5 .....7.75
Newport,Ky. A2 .....7.75
Youngstown Y1, U5 ....7.75

SHEETS, H.R. (14 Ga. & Heavier) High-Strength Low-Alloy

Cleveland J5, R2 .....6.90
Conshohocken,Pa. A3 ...6.95
Ecorse,Mich. G5 .....7.00
Fairfield,Ala. T2 .....6.90
Fairless,Pa. U5 .....6.95
Fontana,Calif. K1 .....7.75
Gary,Ind. U5 .....6.90
Ind.Harbor,Ind. I-2, Y1 6.90
Irvin,Pa. U5 .....6.90
Lackawanna(35) B2 ....6.90
Munhall,Pa. U5 .....6.90
Pittsburgh J5 .....6.90
S.Chicago,Ill. U5 .....6.90
SparrowsPoint(36) B2 ..6.90
Warren,O. R2 .....6.90
Weirton,W.Va. W6 ....6.90
Youngstown U5, Y1 ....6.90

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ..4.925
Cleveland R2 .....5.425
Ind.Harbor,Ind. I-2 ...4.925
Warren,O. R2 .....5.425

SHEETS, Cold-Rolled Steel (Commercial Quality)

Allenport,Pa. P7 .....5.75
Cleveland J5, R2 .....5.75
Conshohocken,Pa. A3 ...5.80
Detroit M1 .....5.75
Ecorse,Mich. G5 .....5.85
Fairfield,Ala. T2 .....5.75
Fairless,Pa. U5 .....5.80
Follansbee,W.Va. F4 ...5.75
Fontana,Calif. K1 .....7.00
Gary,Ind. U5 .....5.75
GraniteCity,Ill. G4 ....5.95
Ind.Harbor,Ind. I-2, Y1 5.75
Irvin,Pa. U5 .....5.75
Lackawanna,N.Y. B2 ..5.75
Mansfield,O. E6 .....5.75
Middletown,O. A10 ....5.75
Newport,Ky. A2 .....5.75
Pitsburg,Calif. C11 ....6.70
Pittsburgh J5 .....5.75
Portsmouth,O. P12 ....5.75
SparrowsPoint,Md. B2...5.75
Steubenville,O. W10 ....5.75
Warren,O. R2 .....5.75
Weirton,W.Va. W6 .....5.75
Yorkville,O. W10 .....5.75
Youngstown Y1 .....5.75

SHEETS, Cold-Rolled High-Strength, Low-Alloy

Cleveland J5, R2 ....8.525
Ecorse,Mich. G5 .....8.625
Fairless,Pa. U5 .....8.575
Fontana,Calif. K1 ....9.775
Gary,Ind. U5 .....8.525
IndianaHarbor,Ind. Y1.8.525
Irvin,Pa. U5 .....8.525
Lackawanna(37) B2 ...8.525
Pittsburgh J5 .....8.525
SparrowsPoint(38) B2 .8.525
Warren,O. R2 .....8.525
Weirton,W.Va. W6 ....8.525
Youngstown Y1 .....8.525

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....6.50
Middletown,O. A10 ....6.25
Warren,O. R2 .....6.50

SHEETS, Culvert

	Cu Steel	Cu Fe
Ashland,Ky. A10	6.65	6.90
Canton,O. R2	6.65	7.15
Fairfield T2	6.65	6.90
Gary,Ind. U5	6.65	6.90
GraniteCity,Ill.G4	6.85	...
Ind.Harbor I-2	6.65	6.90
Irvin,Pa. U5	6.65	6.90
Kokomo,Ind. C16	6.75	...
MartinsFry. W10	6.65	...
Pittsburgh J5	6.65	...
Pitts.,Calif. C11	7.40	...
SparrowsPt. B2	6.65	...

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ....6.90
MartinsFry.,O. W10 ....6.90

SHEETS, Galvanized Steel Hot-Dipped

Ala.City,Ala. R2 .....6.30‡
Ashland,Ky. A10 .....6.30†
Canton,O. R2 .....6.30‡
Dover,O. R1 .....6.30†
Fairfield,Ala. T2 ....6.30†
Gary,Ind. U5 .....6.30†
GraniteCity,Ill. G4 ....6.50*
Ind.Harbor,Ind. I-2 ...6.30†
Irvin,Pa. U5 .....6.30†
Kokomo,Ind. C16 .....6.40‡
MartinsFerry,O. W10 ..6.30*
Middletown,O. A10 ...6.30†
Pittsburg,Calif. C11 ...7.05*
Pittsburgh J5 .....6.30†
SparrowsPt.,Md. B2 ..6.30†
Warren,O. R2 .....6.30†
Weirton,W.Va. W6 ....6.30*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 ....7.025

SHEETS, Galvanized High-Strength Low-Alloy

Irvin,Pa. U5 .....9.275
SparrowsPoint(39) B2..9.275

SHEETS, Galvannealed Steel

Canton,O. R2 .....6.70
Irvin,Pa. U5 .....6.70

SHEETS, Galvanized Ingot Iron (Hot-dipped Continuous)

Ashland,Ky. A10 .....6.55
Middletown,O. A10 ....6.55

SHEETS, Electrogalvanized

Cleveland(28) R2 .....7.125
Niles,O.(28) R2 .....7.125
Weirton,W.Va. W6 ....6.975

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 8.95
Butler,Pa. A10 (type 2) 9.05

SHEETS, Enameling Iron

Ashland,Ky. A10 .....6.325
Cleveland R2 .....6.325
Gary,Ind. U5 .....6.325
GraniteCity,Ill. G4 ....6.525
Ind.Harbor,Ind. I-2, Y1 6.325
Irvin,Pa. U5 .....6.325
Middletown,O. A10 ....6.325
Niles,O. M21 .....6.325
Youngstown Y1 .....6.325

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ...8.35
Ind.Harbor,Ind. I-2 ...8.175
Yorkville,O. W10 .....8.175

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va. W10 6.70
Gary,Ind. U5 .....6.70
Mansfield,O. E6 .....6.70
Middletown,O. A10 ....6.70
Niles,O. M21 .....6.70
Weirton,W.Va. W6 ....6.70

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.10

Key To Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U.S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div. Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Dearborn Division Sharon Steel Corp.
D4 Disston Division, H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 EasternGas&FuelAssoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Div., Jones & Laughlin Steel Corp.
M14 McInnes Steel Co.
M16 Md. Fine&Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Division, Merritt-Chapman & Scott
M21 Mallory-Sharon Titanium Corp.

N1 National Standard Co.
N2 National Supply Co.
N3 National Tube Div., U.S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N14 Northwest.SteelRoll.Mill
N15 Northwestern S.&W. Co.
N19 Northeastern Steel Corp.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co. Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 Reliance Div.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service

T2 Tenn.Coal & Iron Div., U.S. Steel Corp.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U.S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U.S. Steel Supply Div., U.S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Div., H. K. Porter Co. Inc.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	4.675
Allenport,Pa. P7	4.675
Alton,Ill. L1	4.875
Ashland,Ky.(8) A10	4.675
Atlanta A11	4.875
Bessemer,Ala. T2	4.675
Birmingham C15	4.925
Bridgeport,Conn. N19	4.625
Buffalo(27) R2	4.675
Conshohocken,Pa. A3	4.725
Detroit M1	4.775
Ecorse,Mich. G5	4.775
Fairfield,Ala. T2	4.675
Fontana,Calif. K1	5.525
Gary,Ind. U5	4.675
Houston S5	4.925
Ind.Harbor,Ind. I-2, Y1	4.675
Johnstown,Pa.(25) B2	4.675
KansasCity,Mo. S5	4.925
Lackaw'na,N.Y.(25) B2	4.675
LosAngeles(25) B3	5.425
Minnequa,Colo. C10	5.775
Pittsburg,Calif. C11	5.425
Riverdale,Ill. A1	4.675
SanFrancisco S7	5.95
Seattle(25) B3	5.675
Seattle N14	5.675
Sharon,Pa. S3	4.675
S.Chicago,Ill. W14	4.675
S.SanFrancisco(25) B3	5.425
SparrowsPoint,Md. B2	4.675
Sterling,Ill.(1) N15	4.675
Sterling,Ill. N15	4.775
Torrance,Calif. C11	5.425
Warren,O. R2	4.675
Weirton,W.Va. W6	4.675
Youngstown U5	4.675

STRIP, Hot-Rolled Alloy

Bridgeport,Conn. N19	7.50
Carnegie,Pa. S18	7.75
Gary,Ind. U5	7.75
Ind.Harbor,Ind. Y1	7.75
LosAngeles B3	8.95
Newport,Ky. A2	7.75
Sharon,Pa. S3	7.75
S.Chicago,Ill. W14	7.75
Youngstown U5, Y1	7.75

STRIP, Hot-Rolled High-Strength, Low-Alloy

Bessemer,Ala. T2	6.95
Conshohocken,Pa. A3	6.95
Ecorse,Mich. G5	7.05
Fairfield,Ala. T2	6.95
Gary,Ind. U5	6.95
Houston S5	7.20
Ind.Harbor,Ind. I-2, Y1	6.95
KansasCity,Mo. S5	7.20
Lackawanna,N.Y. B2	6.95
LosAngeles(25) B3	7.70
Seattle(25) B3	7.95
Sharon,Pa. S3	6.95
S.SanFrancisco(25) B3	7.70
SparrowsPoint,Md. B2	6.95
Warren,O. R2	6.95
Weirton,W.Va. W6	6.95
Youngstown U5 Y1	6.95

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	4.925
Warren,O. R2	5.425

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	6.85
Baltimore T6	6.85
Boston T6	7.40
Buffalo S40	6.85
Cleveland A7, J5	6.85
Conshohocken,Pa. A3	6.90
Dearborn,Mich. D3	6.95
Detroit D2, M1, P20	6.95
Dover,O. G6	6.85
Ecorse,Mich. G5	6.95
Follansbee,W.Va. F4	6.85
Fontana,Calif. K1	8.70
FranklinPark,Ill. T6	6.95
Ind.Harbor,Ind. Y1	6.85
Indianapolis C8	7.00
LosAngeles C1	8.80
NewBedford,Mass. R10	7.30
NewBritain(10) S15	6.85
NewCastle,Pa. B4, E5	6.85
NewHaven,Conn. D2	7.30
NewKensington,Pa. A6	6.85
Pawtucket,R.I. R3	7.50
Pawtucket,R.I. N8	7.40
Pittsburgh J5	6.85
Riverdale,Ill. A1	6.95
Rome,N.Y.(32) R6	6.85
Sharon,Pa. S3	6.85
Trenton,N.J.(31) R5	8.30
Wallingford,Conn. W2	7.30
Warren,O. R2, T5	6.85
Weirton,W.Va. W6	6.85
Worcester,Mass. A7	7.40
Youngstown C8, Y1	6.85

STRIP, Cold-Rolled Alloy

Boston T6	14.90
Carnegie,Pa. S18	14.55
Cleveland A7	14.55
Dover,O. G6	14.55
FranklinPark,Ill. T6	14.55
Harrison,N.J. C18	14.55
Indianapolis C8	14.70
Pawtucket,R.I. N8	14.90
Sharon,Pa. S3	14.55
Worcester,Mass. A7	14.85
Youngstown C8	14.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	10.00
Dearborn,Mich. D3	10.10
Dover,O. G6	10.10
Ecorse,Mich. G5	10.10
Ind.Harbor,Ind. Y1	10.20
Sharon,Pa. S3	10.00
Warren,O. R2	10.00
Weirton,W.Va. W6	10.00
Youngstown Y1	10.20

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	8.50	10.10	12.30	15.30	18.25
Boston T6	8.50	10.10	12.30	15.30	18.25
Bristol,Conn. W1	...	...	12.30	15.30	18.25
Carnegie,Pa. S18	...	9.80	12.00	15.00	....
Cleveland A7	7.95	9.80	12.00	15.00	17.95
Cleveland C7	...	9.80	12.00	15.00	17.95
Dover,O. G6	7.95	9.80	12.00	15.00	17.95
Detroit D2	8.75	10.20	12.40	15.40	....
Dearborn,Mich. D3	8.75	10.20	12.40	....	....
FranklinPark,Ill. T6	8.05	9.80	12.00	15.00	17.95
Harrison,N.J. C18	...	...	12.30	15.30	18.25
Indianapolis C8	8.10	9.95	12.00	15.00	17.95
NewBritain,Conn.(10) S15	7.95	9.80	12.00	15.00	17.95
NewCastle,Pa. B4, E5	7.95	9.80	12.00	15.00	....
NewHaven,Conn. D2	9.10	10.40	12.60	15.60	....
NewKensington,Pa. A6	7.95	9.80	12.00	15.00	....
NewYork W3	...	*10.40*	*12.60*	*15.60*	*18.55*
Pawtucket,R.I. N8	8.50	10.10	12.30	15.30	18.25
Riverdale,Ill. A1	8.05	9.80	12.00	15.00	17.95
Rome,N.Y.(32) R6	7.95	9.80	12.00	15.00	17.95
Sharon,Pa. S3	8.65	10.10	12.30	15.30	18.25
Trenton,N.J. R5	...	*10.40*	*12.50*	*15.50*	*18.75*
Wallingford,Conn. W2	*9.10*	*10.40*	*12.60*	*15.60*	*18.45*
Warren,O. T5	7.95	9.80	12.00	15.00	17.95
Worcester,Mass. A7, T6	8.50	10.10	12.30	15.30	18.25
Youngstown C8	7.95	9.80	12.00	15.00	17.95

Spring Steel (Tempered)

	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	16.80	20.65	....
Buffalo W12	16.80	....	....
FranklinPark,Ill. T6	17.15	21.00	25.35
Harrison,N.J. C18	16.80	20.65	25.00
NewYork W3	*17.10*	*20.95*	*25.30*
Palmer,Mass. W12	16.80	....	....
Trenton,N.J. R5	*17.10*	*20.95*	*25.30*
Worcester,Mass. A7, T6	16.80	20.65	25.00
Youngstown C8	17.15	21.00	25.35

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	7.60

STRIP, C.R. Electrogalvanized

Cleveland A7	6.85*
Dover,O. G6	6.85*
Riverdale,Ill. A1	6.95*
Warren,O. B9, T5	6.85*
Worcester,Mass. A7	7.40*
Youngstown C8	6.85*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Sharon,Pa. S3	6.975

TIGHT COOPERAGE HOOP

Atlanta A11	5.40
Riverdale,Ill. A1	5.25
Sharon,Pa. S3	5.10
Youngstown U5	5.10

SILICON STEEL

H.R. SHEETS(22 Ga., cut lengths)

	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	...	....	11.00	12.05	13.05
Brackenridge,Pa. A4	...	....	11.00	12.05	13.05
Mansfield,O. E6	9.20	10.35	11.00	12.05	13.05
Newport,Ky. A2	9.20	10.35	11.00	12.05	13.05
Niles,O. M21	9.20	10.35	11.00	12.05	....
Vandergrift,Pa. U5	...	10.35	11.00	12.05	13.05
Warren,O. R2	9.20	10.35	11.00	12.05	....
Zanesville,O. A10	...	10.35	11.00	12.05	13.05
Zanesville,O. A10 (FP coils)	...	10.85	11.525	12.575	13.55
Zanesville,O. A10 (SP coils)	...	....	11.025	12.075	13.05

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge,Pa. A4	...	....	11.525	12.575	13.55
GraniteCity,Ill. G4	9.40*	10.55*	11.225*	12.275*	....
IndianaHarbor,Ind. I-2	9.20†	10.35*	11.025*	12.075*	....
Mansfield,O. E6	9.70	10.85	11.525	12.575	13.55
Vandergrift,Pa. U5	9.20*	10.35*	11.025*	12.075*	13.05*
Vandergrift,Pa. U5	...	10.85†	11.525†	12.575†	13.55†
Warren,O. R2	9.20*	10.85	11.525	12.575	13.55

H.R. SHEETS (22 Ga., cut lengths)

	Transformer Grades T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	14.05	14.60	15.10	16.15
Brackenridge,Pa. A4	14.05	....	....	....
Vandergrift,Pa. U5	14.05	14.60	15.10	16.15
Zanesville,O. A10	14.05	14.60	15.10	16.15

C.R. COILS & CUT LENGTHS (22 Ga.)

	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	16.90	18.50	19.00	19.50	....
Butler,Pa. A10	....	....	18.50	19.00	19.50	....
Vandergrift,Pa. U5	15.90	16.90	18.50	19.00	19.50	14.55**
Warren,O. R2	....	....	....	....	....	14.55‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. **Cut lengths, ¾-cent lower.

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa, Pa. J5	$8.40	$8.65	$9.05
Fairfield,Ala. T2	8.50	8.75	9.15
Fairless,Pa. U5	8.50	8.75	9.15
Fontana,Calif. K1	9.15	9.40	9.80
Gary,Ind. U5	8.40	8.65	9.05
GraniteCity,Ill. G4	8.50	8.75	9.15
IndianaHarbor,Ind. I-2, Y1	8.40	8.65	9.05
Irvin,Pa. U5	8.40	8.65	9.05
Niles,O. R2	8.40	8.65	9.05
Pittsburg,Calif. C11	9.15	9.40	9.80
SparrowsPoint,Md. B2	8.50	8.75	9.15
Weirton,W.Va. W6	8.40	8.65	9.05
Yorkville,O. W10	8.40	8.65	9.05

ELECTROTIN (22-27 Gage; Dollars per 100 lb)

Aliquippa,Pa. J5	7.425	7.625	....
Niles,O. R2	7.425	7.625	7.925

TINPLATE, American	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$9.70	$9.95
Fairfield,Ala. T2	9.80	10.05
Fairless,Pa. U5	9.80	10.05
Fontana,Calif. K1	10.45	10.70
Gary,Ind. U5	9.70	9.95
Irvin,Pa. U5	9.70	9.95
Pitts.,Calif. C11	10.45	10.70
Sp.Pt.,Md. B2	9.80	10.05
Weirton,W.Va. W6	9.70	9.95
Yorkville,O. W10	9.70	9.95

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$7.50
Fairfield,Ala. T2	7.60
Fairless,Pa. U5	7.60
Fontana,Calif. K1	8.25
Gary,Ind. U5	7.50
GraniteCity,Ill. G4	7.60
Ind.Harbor,Ind. I-2, Y1	7.50
Irvin,Pa. U5	7.50
Niles,O. R2	7.50
Pittsburg,Calif. C11	8.25
SparrowsPoint,Md. B2	7.60
Weirton,W.Va. W6	7.50
Yorkville,O. W10	7.50

HOLLOWARE ENAMELING Black Plate (29 Gage)

Aliquippa,Pa. J5	$7.15
Gary,Ind. U5	7.15
GraniteCity,Ill. G4	7.25
Ind.Harbor,Ind. Y1	7.15
Irvin,Pa. U5	7.15
Yorkville,O. W10	7.15

MANUFACTURING TERNES (Special Coated; Base Box)

Gary,Ind. U5	$9.20
Irvin,Pa. U5	9.20

ROOFING SHORT TERNES (8 lb Coated; Base Box)

Gary,Ind. U5	$10.75

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	7.20
Aliquippa,Pa. J5	7.20
Alton,Ill. L1	7.40
Atlanta A11	7.40
Bartonville,Ill. K4	7.30
Buffalo W12	7.20
Chicago W13	7.20
Cleveland A7, C20	7.20
Crawfordsville,Ind. M8	7.30
Donora,Pa. A7	7.20
Duluth A7	7.20
Fairfield,Ala. T2	7.20
Fostoria,O.(24) S1	7.30
Houston S5	7.45
Jacksonville,Fla. M8	7.55
Johnstown,Pa. B2	7.20
Joliet,Ill. A7	7.20
KansasCity,Mo. S5	7.45
Kokomo,Ind. C16	7.30
LosAngeles B3	8.15
Minnequa,Colo. C10	7.45
Monessen,Pa. P7, P16	7.20
N.Tonawanda,N.Y. B11	7.20
Palmer,Mass. W12	7.50
Pittsburg,Calif. C11	8.15
Portsmouth,O. P12	7.20
Rankin,Pa. A7	7.20
S.Chicago,Ill. R2	7.20
S.SanFrancisco C10	8.15
SparrowsPoint,Md. B2	7.30
Sterling,Ill.(1) N15	7.20
Sterling,Ill. N15	7.30
Struthers,O. Y1	7.20
Waukegan,Ill. A7	7.20
Worcester,Mass. A7	7.50

WIRE, Gal'd ACSR for Cores

Bartonville,Ill. K4	11.75
Buffalo W12	11.75
Cleveland A7	11.75
Donora,Pa. A7	11.75
Duluth A7	11.75
Johnstown,Pa. B2	*11.90*
Minnequa,Colo. C10	11.875
Monessen,Pa. P16	11.75
Muncie,Ind. I-7	11.95
NewHaven,Conn. A7	12.05
Palmer,Mass. W12	12.05
Pittsburg,Calif. C11	12.55
Portsmouth,O. P12	11.75
Roebling,N.J. R5	12.05
SparrowsPt.,Md. B2	*12.00*
Struthers,O. Y1	11.75
Trenton,N.J. A7	12.05
Waukegan,Ill. A7	11.75
Worcester,Mass. A7	12.05

ROPE WIRE (A)

Bartonville,Ill. K4	11.55
Buffalo W12	11.55
Fostoria,O. S1	11.55
Johnstown,Pa. B2	11.55
Monessen,Pa. P7, P16	11.55
Muncie,Ind. I-7	11.75
Palmer,Mass. W12	11.85
Portsmouth,O. P12	11.55
Roebling,N.J. R5	11.85
SparrowsPt.,Md. B2	11.65
Struthers,O. Y1	11.55
Worcester,Mass. J4	11.85

(A) Plow and Mild Plow; add 0.25c for Improved Plow

WIRE, Upholstery Spring

Aliquippa,Pa. J5	8.40
Alton,Ill. L1	8.60
Buffalo W12	8.40
Cleveland A7	8.70
Donora,Pa. A7	8.70
Duluth A7	8.70
Johnstown,Pa. B2	*8.70*
KansasCity,Mo. S5	8.65
LosAngeles B3	*9.65*
Minnequa,Colo. C10	8.60
Monessen,Pa. P7, P16	8.40
NewHaven,Conn. A7	9.00
Palmer,Mass. W12	8.70
Pittsburg,Calif. C11	9.35
Portsmouth,O. P12	8.40
Roebling,N.J. R5	8.70
S.Chicago,Ill. R2	*8.70*
S.SanFrancisco C10	9.35
SparrowsPt.,Md. B2	*8.80*
Struthers,O. Y1	8.40
Trenton, N.J. A7	9.00
Waukegan,Ill. A7	8.70
Worcester,Mass. A7	9.00

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	8.725
Alton,Ill. L1	8.925
Bartonville,Ill. K4	8.825
Buffalo W12	8.725
Cleveland A7	9.025
Donora,Pa. A7	9.025
Duluth A7	9.025
Fostoria,O. S1	8.775
Johnstown,Pa. B2	*9.025*
LosAngeles B3	*9.975*
Milbury,Mass.(12) N6	9.025
Minnequa,Colo. C10	8.975
Monessen,Pa. P7, P16	8.725
Muncie,Ind. I-7	8.925
Palmer,Mass. W12	9.025
Pittsburg,Calif. C11	9.675
Portsmouth,O. P12	8.725
Roebling,N.J. R5	9.025
S.Chicago,Ill. R2	*9.025*
S.SanFrancisco C10	9.675
SparrowsPt.,Md. B2	*9.125*
Struthers,O. Y1	8.725
Trenton,N.J. A7	9.325
Waukegan,Ill. A7	9.025
Worcester J4, T6	9.025
Worcester,Mass. A7	9.325

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1	14.35
Bartonville,Ill. K4	14.25
Buffalo W12	14.15
Chicago W13	14.15
Cleveland A7	14.15
Crawfordsville,Ind. M8	14.25
Fostoria,O. S1	14.15
Jacksonville,Fla. M8	14.50
Johnstown,Pa. B2	14.15
Kokomo,Ind. C16	14.15
Minnequa,Colo. C10	13.90
Monessen,Pa. P6	14.15
Muncie,Ind. I-7	14.35
Palmer,Mass. W12	14.45
Roebling,N.J. C10	14.45
S.SanFrancisco C10	14.50
Waukegan,Ill. A7	14.15
Worcester,Mass. A7, T6	14.45

WIRE

WIRE, Tire Bead

Bartonville,Ill. K4	....15.25
Monessen,Pa. P16	....15.45
Roebling,N.J. R5	....15.60

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	.....10.75
Baltimore T6	.....11.05
Boston T6	.....11.05
Buffalo W12	.....10.75
Cleveland A7	.....10.75
Cra vfordsville,Ind. M8	10.75
Dover,O. G6	.....10.75
Fostoria,O. S1	.....10.75
FranklinPark,Ill. T6	..10.85
Kokomo,Ind. C16	.....10.75
Massillon,O. R8	.....10.75
Milwaukee C23	.....10.95
Monessen,Pa. P7, P16	.10.75
NewKensington,Pa. A6	.10.75
Palmer,Mass. W12	....11.05
Pawtucket,R.I. N8	....11.05
Riverdale,Ill. A1	.....10.85
Rome,N.Y. R6	.....10.75
Trenton,N.J. R5	.....11.05
Worcester,Mass. A7, T6	11.05

NAILS & POLISHED STAPLES,

Stock	Col.
AlabamaCity,Ala. R2	..164
Aliquippa,Pa. J5	164
Atlanta A11	166
Bartonville,Ill. K4	166
Crawfordsville,Ind. M8	.166
Donora,Pa. A7	164
Duluth A7	164
Fairfield,Ala. T2	164
Houston,Tex. S5	169
Jack'ville,Fla. (20) M8	.175
Johnstown,Pa. B2	164
Joliet,Ill. A7	164
KansasCity,Mo. S5	169
Kokomo,Ind. C16	166
Minnequa,Colo. C10	169
Monessen,Pa. P7	164
Pittsburg,Calif. C11	183
Rankin,Pa. A7	164
S.Chicago,Ill. R2	164
SparrowsPt.,Md. B2	166
Sterling,Ill. (7) N15	166
Worcester,Mass. A7	...170

NAILS, Stock — **Col.**

Chicago W13	164
Cleveland A9	170

(To Wholesalers; per cwt)

Galveston,Tex. D7	....$8.75

NAILS, Cut (100 lb keg)
To Dealers (33)

Conshohocken,Pa. A3	..$9.80
Wheeling,W.Va. W10	..9.80

TIE WIRE, Automatic Baler (14½ Ga.)(Per 97 lb Net Box)

Coil No. 3150	
AlabamaCity,Ala. R2	..$9.53
Atlanta A11	.....9.63
Bartonville,Ill. K4	....9.63
Buffalo W12	.....10.05
Chicago W13	.....9.53
Crawfordsville,Ind. M8	..9.63
Donora,Pa. A7	.....9.53
Duluth A7	.....9.53
Fairfield,Ala. T2	.....9.53
Houston S5	.....9.78
Jack'ville,Fla. M8	....10.09
Johnstown,Pa. B2	....9.53
Joliet,Ill. A7	.....9.53
KansasCity,Mo. S5	....9.78
Kokomo,Ind. C16	.....9.63
LosAngeles B3	.....10.32
Minnequa,Colo. C10	....9.78
Pittsburg,Calif. C11	...10.31
S.Chicago,Ill. R2	.....9.53
S.SanFrancisco C10	...10.31
SparrowsPt.,Md. B2	....9.63
Sterling,Ill.(37) N15	....9.63

Coil No. 6500 Stand.	
AlabamaCity,Ala. R2	..$9.85
Atlanta A11	.....9.95
Bartonville,Ill. K4	....9.95
Buffalo W12	.....10.35
Chicago W13	.....9.85
Crawfordsville,Ind. M8	..9.95
Donora,Pa. A7	.....9.85
Duluth A7	.....9.85
Fairfield,Ala. T2	.....9.85
Houston S5	.....10.10
Jacksonville,Fla. M8	...10.41
Johnstown,Pa. B2	....9.85
Joliet,Ill. A7	.....9.85
KansasCity,Mo. S5	....10.10
Kokomo,Ind. C16	.....9.95
LosAngeles B3	.....10.65
Minnequa,Colo. C10	....10.10
Pittsburg,Calif. C11	...10.65
S.Chicago,Ill. R2	.....9.85
S.SanFrancisco C10	...10.65
SparrowsPt.,Md. B2	....9.95
Sterling,Ill.(37) N15	....9.95

Coil Interim	
AlabamaCity,Ala. R2	.$9.90
Atlanta A11	.....10.00
Bartonville,Ill. K4	....10.00
Buffalo W12	.....10.40
Chicago W13	.....9.90
Crawfordsville,Ind. M8	.10.00
Donora,Pa. A7	.....9.90
Duluth A7	.....9.90
Fairfield,Ala. T2	.....9.91
Houston S5	.....10.15
Jacksonville,Fla. M8	..10.46
Johnstown,Pa. B2	....9.90
Joliet,Ill. A7	.....9.90
KansasCity,Mo. S5	....10.15
Kokomo,Ind. C16	.....10.00
LosAngeles B3	.....10.70
Minnequa,Colo. C10	...10.15
Pittsburg,Calif. C11	...10.70
S.Chicago,Ill. R2	.....9.90
S.SanFrancisco C10	...10.70
SparrowsPt.,Md. B2	....10.00
Sterling,Ill.(37) N15	....10.00

WIRE, Barbed	Col.
AlabamaCity,Ala. R2	..184**
Aliquippa,Pa. J5	.....181§
Atlanta A11	.....190*
Bartonville,Ill. K4	190
Crawfordsville,Ind. M8	..190
Donora,Pa. A7	.....184†
Duluth A7	.....184†
Fairfield,Ala. T2	.....184†
Houston,Tex. S5	....189**
Jacksonville,Fla. M8	195
Johnstown,Pa. B2	....188*
Joliet,Ill. A7	.....184†
KansasCity,Mo. S5	....189**
Kokomo,Ind. C16	.....186†
Minnequa,Colo. C10	....189**
Monessen,Pa. P7	.....188*
Pittsburg,Calif. C11	...204†
Rankin,Pa. A7	.....184†
S.Chicago,Ill. R2	.....184**
S.SanFrancisco C10	..204**
SparrowsPoint,Md. B2	190*
Sterling,Ill.(7) N15	....190*

WOVEN FENCE, 9-15 Ga. Col.

Ala.City,Ala. R2	.....176**
Aliq'ppa,Pa. 9-14½ga.	J5 179§
Atlanta A11	.....182*
Bartonville,Ill. K4	182
Crawfordsville,Ind. M8	..182
Donora,Pa. A7	.....176†
Duluth A7	.....176†
Fairfield,Ala. T2	....176†
Houston,Tex. S5	....181**
Jacksonville,Fla. M8	187
Johnstown,Pa.(43) B2	..180*
Joliet,Ill. A7	.....176†
KansasCity,Mo. S5	..181**
Kokomo,Ind. C16	.....178†
Minnequa,Colo. C10	..181**
Monessen,Pa. 9 ga. P7	..180*
Pittsburg,Calif. C11	...199†
Rankin,Pa. A7	.....176†
S.Chicago,Ill. R2	.....176**
Sterling,Ill.(7) N15	....182*

WIRE (16 gage)	An'ld Galv. Stone	Stone
Ala.City,Ala.	R2 15.70	17.25**
Aliq'ppa,Pa.	J5 ..15.70	17.50
Bartonville	K4 ..15.80	17.75
Buffalo	W12 ....16.10	....
Cleveland	A7 ....15.70	....
Crawf'dsville	M8 15.80	17.75
Fostoria,O.	S1 ..16.20	17.75†
Houston	S5 ...15.95	17.50**
Jacksonville	M8..16.05	18.00
Johnstown	B2 ..15.70	17.65*
Kan.City,Mo.	S5 15.95	....
Kokomo	C16 ..15.80	17.35†
Minnequa	C10 ..16.05	17.75**
P'im'r,Mass.	W2 16.10	17.65*
Pitts.,Calif.	C11 16.05	17.60†
SparrowsPt.	B2..15.80	17.75*
Sterling(37)	N15 15.80	17.75*
Waukegan	A7 ..15.70	17.25†
Worcester	A7 ....16.00	....

WIRE, Merchant Quality (6 to 8 gage)	An'ld Galv.
Ala.City,Ala.	R2 7.95 8.35**
Aliquippa	J5 ....7.95 8.475§
Atlanta (48)	A11 8.05 8.65*
Bartonville(48)	K4..8.05 8.65
Buffalo	W12 ....8.10 8.50†
Cleveland	A7 ....7.95 ....
Crawfordsville	M8 ..8.05 8.65
Donora,Pa.	A7 ..7.95 8.35†
Duluth	A7 .....7.95 8.35†
Fairfield	T2 ....7.95 8.35†
Houston(48)	S5 ..8.20 8.60**
Jacks'ville,Fla.	M8 8.30 8.90
Johnstown	B2(48) 7.95 8.55*
Joliet,Ill.	A7 ....7.95 8.35†
Kans.City(48)	S5 8.20 8.60**
Kokomo	C16 ....8.05 8.45†
LosAngeles	B3 ...8.90 9.50*
Minnequa	C10 ..8.20 8.60**
Monessen	P7 (48) 7.95 8.55*
Palmer,Mass.	W12 8.40 8.80†
Pitts.,Calif.	C11 ..8.90 9.30†
Portsmouth,O.	P12 7.95 ....
Rankin,Pa.	A7 ...7.95 8.35†
S.Chicago	R2 ...7.95 8.35**
S.SanFran.	C10 ..8.90 9.30**
Spar'wsPt.	B2(48) 8.05 8.65*
Sterling(37)(48)	N15 8.05 8.65*
Struth'rs,O.(48)	Y1 7.95 8.45‡
Worcester,Mass.	A7 8.25 8.65†

Based on zinc price of: *13.50c. †5c. §10c. ‡Less than 10c. ††13c. **Subject to zinc equalization extras.

BALE TIES, Single Loop — **Col.**

AlabamaCity,Ala. R2	..190
Atlanta A11	192
Bartonville,Ill. K4	192
Crawfordsville,Ind. M8	..192
Donora,Pa. A7	190
Duluth A7	190
Fairfield,Ala. T2	190
Houston S5	195
Jacksonville,Fla. M8	197
Joliet,Ill. A7	190
KansasCity,Mo. S5	195
Kokomo,Ind. C16	192
Minnequa,Colo. C10	195
Pitts.,Calif. C11	214
S.Chicago,Ill. R2	190
S.SanFrancisco C10	214
Sterling,Ill.(7) N15	192
SparrowsPoint,Md. B2	..192
Tonawanda,N.Y. B12	169
Williamsport,Pa. S19	...175

FENCE POSTS

ChicagoHts.,Ill. C2, I-2	.167
Duluth A7	167
Franklin,Pa. F5	167
Huntington,W.Va. W7	..169
Johnstown,Pa. B2	167
Marion,O. P11	167
Minnequa,Colo. C10	172
Sterling,Ill.(1) N15	167
Tonawanda,N.Y. B12	169
Williamsport,Pa. S19	175

FASTENERS

(Base discounts, full container quantity, per cent off list, f.o.b. mill)

BOLTS

Carriage, Machine Bolts

Full Size Body (cut thread)
½ in. and smaller:
6 in. and shorter.. 55
Longer than 6 in. .. 46.5
⅝ in. thru 1 in.:
6 in. and shorter .. 46.5
Longer than 6 in. .. 44
1⅛ in. and larger:
All lengths 44
Undersized Body (rolled thread)
½ in. and smaller:
6 in. and shorter .. 55

Carriage, Machine, Lag Bolts
Hot Galvanized:

½ in and smaller:
6 in. and shorter .. 35
Longer than 6 in. .. 23
⅝ in. thru 1 in.:
6 in. and shorter .. 20
Longer than 6 in. .. 20
1⅛ in. and larger:
All lengths 20

Lag Bolts

All diameters:
6 in. and shorter 55
Longer than 6 in. .. 47

Plow and Tap Bolts

½ in. and smaller by 6 in. and shorter 54
Larger than ½ in. or longer than 6 in. 47

Blank Bolts 47

Step, Elevator, Tire Bolts 54

NUTS

Reg. & Heavy Square Nuts:
All sizes 59

Square Nuts, Reg. & Heavy, Hot Galvanized:
All sizes 45

Hex Nuts, Reg. & Heavy, Hot Pressed:

¾ in. and smaller .	63
⅞ in. to 1 in., incl.	59.5
1⅛ in. to 1½ in., incl.	64
1⅝ in. and larger..	58

Hex Nuts, Reg. & Heavy, Cold Punched:

¾ in. and smaller..	63
⅞ in. to 1½ in., incl.	59.5
1⅝ in. and larger .	58

Hex Nuts, All Types, Hot Galvanized:

¾ in. and smaller..	50
⅞ in. to 1 in., incl.	46
1⅛ in. to 1½ in., incl.	51

Hex Nuts, Semifinished, Reg. & Heavy (Incl. Slotted):

¾ in. and smaller..	63
⅞ in. to 1½ in., incl.	59.5
1⅝ in. and larger ..	58

Hex Nuts, Finished (Incl. Slotted and Castellated):

1 in. and smaller ..	65
1⅛ in. to 1½ in., incl.	62
1⅝ in. and larger..	58

CAP AND SET SCREWS

(Base discounts, packages, per cent off list, f.o.b. mill)

Hex Head Cap Screws, Coarse or Fine Thread, Bright:

6 in. and shorter:

⅝ in. and smaller..	47
¾, ⅞ and 1 in. diam.	31
Longer than 6 in.:	
⅝ in. and smaller..	18.5
¾, ⅞ and 1 in. diam.	5.5

High Carbon, Heat Treated:

6 in. and shorter:

⅝ in. and smaller..	34
¾, ⅞ and 1 in. diam.	13
Longer than 6 in.:	
⅝ in. and smaller.	+1
¾, ⅞ and 1 in. diam.	+19

Fillister Head, Coarse Thread:
Listed Sizes ..... +31

Flat Head, Coarse Thread:
½ in. and smaller by 6 in. and shorter. . +57

Set Screws, Square Head, Cup Point, Coarse Thread:

Through 1 in. diam.:
6 in. and shorter .. 11
Longer than 6 in. .. +10

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½-in., larger 10.85
7/8-in. under List less 26.5%

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	24.55	22.84
1¼	13	....	29.07	22.68
1½	13	27.45	32.14	25.08
1¾	13	32.43	37.97	29.64
2	13	36.34	42.56	33.21
2¼	13	40.93	47.94	37.42
2¼	12	44.42	52.03	40.61
2½	12	48.94	57.31	44.73
2¾	12	52.99	62.05	48.44
3	12	56.51	66.18	51.66

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Tee Rails All	Tee Rails 60 lb Under
RAILS				
Bessemer,Pa. U5	5.075	4.975	5.025	6.00
Ensley,Ala. T2	5.075	4.975	....	6.00
Fairfield,Ala. T2	....	....	....	6.00
Gary,Ind. U5	5.075	4.975	5.025	....
Huntington,W.Va. C15	....	....	....	6.00
IndianaHarbor,Ind. I-2	5.075	4.975	5.025	....
Johnstown,Pa. B2	....	....	...(16)	6.00
Lackawanna,N.Y. B2	5.075	4.975	....	6.00
Minnequa,Colo. C10	5.075	4.975	....	6.50
Steelton,Pa. B2	5.075	4.975	....	....
Williamsport,Pa. S19	....	....	....	6.15

TIE PLATES

Fairfield,Ala. T2	.....6.025
Gary,Ind. U5	.....6.025
Ind.Harbor,Ind. I-2	...6.025
Lackawanna,N.Y. B2	..6.025
Minnequa,Colo. C10	....6.025
Seattle B3	.....6.175
Steelton,Pa. B2	.....6.025
Torrance,Calif. C11	...6.175

JOINT BARS

Bessemer,Pa. U5	.....6.35
Fairfield,Ala. T2	.....6.35
Ind.Harbor,Ind. I-2	....6.35
Joliet,Ill. U5	.....6.35
Lackawanna,N.Y. B2	..6.35
Minnequa,Colo. C10	...6.35
Steelton,Pa. B2	.....6.35

AXLES

Ind.Harbor,Ind. S13	*.....8.35*
Johnstown,Pa. B2	*.....8.35*

TRACK BOLTS, Untreated

Cleveland R2	.....13.10
KansasCity,Mo. S5	....13.10
Lebanon,Pa. B2	.....13.10
Minnequa,Colo. C10	...13.10
Pittsburgh P14	.....13.10
Seattle B3	.....13.60

SCREW SPIKES

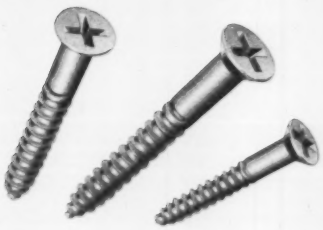
Cleveland R2	.....12.85
Pittsburgh P14	.....12.85

STANDARD TRACK SPIKES

Fairfield,Ala. T2	.....8.775
Ind.Harbor,Ind. I-2, Y1	.8.775
KansasCity,Mo. S5	....8.775
Lebanon,Pa. B2	.....8.775
Minnequa,Colo. C10	....8.775
Pittsburgh J5	.....8.775
Seattle B3	.....9.275
S.Chicago,Ill. R2	.....8.775
Struthers,O. Y1	.....8.775
Youngstown R2	.....8.775

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛ to under 1 7/16 in.; 1 7/16 to under 1 5/16 in.; 6.23c; 1 15/16 to 8 in.; inclusive, 6.60c.
(6) Chicago or Birm. base.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) 5/8" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) Plus 1c per 100 lb.
(21) New Haven, Conn., base.
(22) Deld. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Delivered in mill zone, 5.685c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over 5/8-in.; 7.30c, for widths 5/8-in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.685c.
(43) 9-14½ Ga.
(48) 6-7 Ga.
(49) 3½-in. and smaller rounds; 8.65c, over 3½-in. and other shapes.



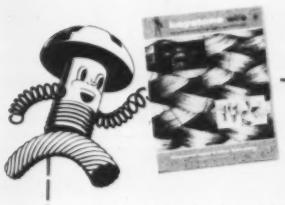
Satisfied customers for KEELER BRASS CO.

Keeler Brass Company, Grand Rapids, Michigan, keeps their customers satisfied by producing a premium quality product at lowest possible cost. Typical examples are their Cross Recess Screws shown here. They are carefully designed so that one driver fits the entire range of sizes. Slots are sharp and clean, threads and points are sharp and uniform. Surfaces are smooth.

Satisfied user of KEYSTONE "XL" WIRE

To efficiently produce their Cross Recess Screws, Keeler Brass Company depends on Keystone "XL" Wire. The reasons are many: cross recess punches turn out considerably more pieces per punch than were formerly produced with another wire. Rejects are 5% to 10% lower. Customer acceptance is up.

Flowability of Keystone "XL" Wire is the secret. "XL" is a wire of superior *flowability*—the result of careful specification of materials and manufacturing techniques.



Do you have difficult parts to cold head? Do you want to reduce your costs and improve the quality of your product? Keystone "XL" Wire may be your answer! A Keystone Wire Specialist will gladly analyze your needs and help you select the wire best suited to your requirements. Call, write, or fill in the coupon on the right.

Keystone Steel & Wire Company, Peoria 7, Illinois

KEYSTONE
WIRE FOR INDUSTRY

KEYSTONE STEEL & WIRE COMPANY
Peoria 7, Illinois

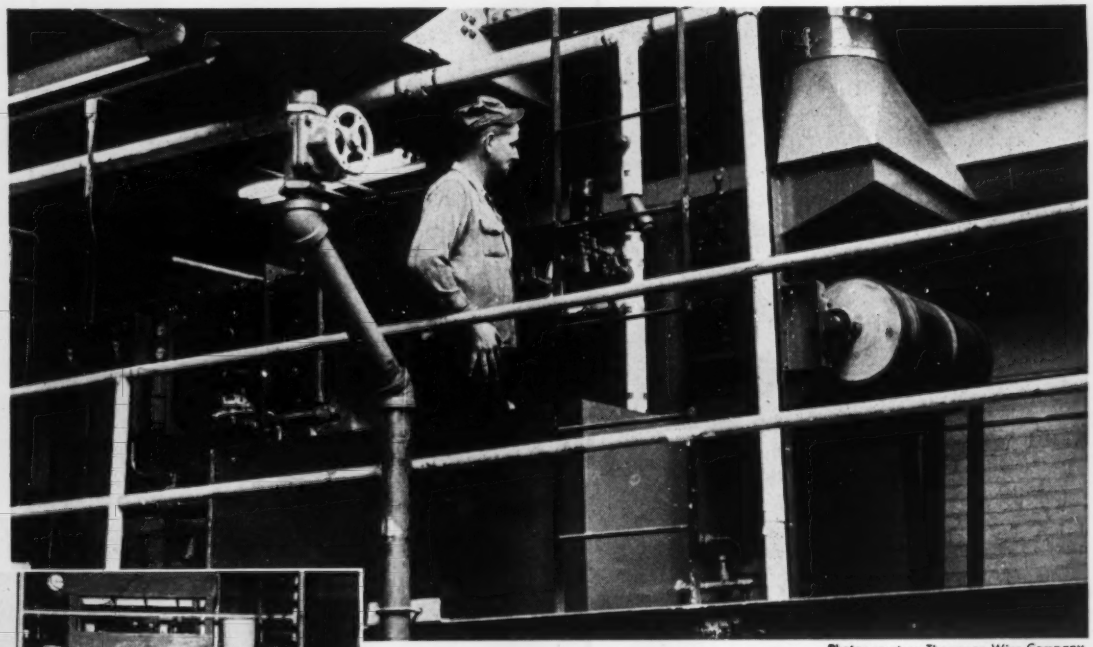
Mail coupon for free *COLD HEADING FACTS!* Discusses methods, technical facts, wire requirements and other data.

Name_____ Title_____

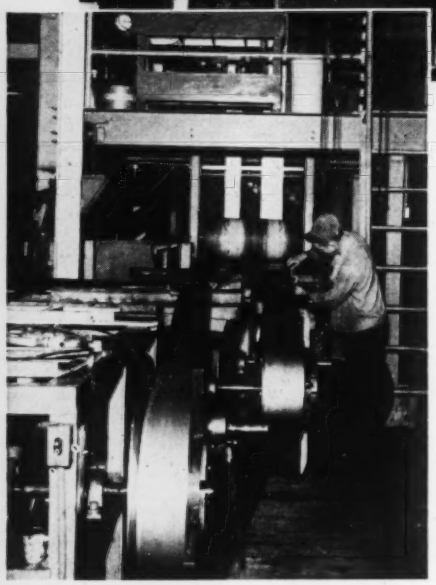
Company_____

Street_____

City_____ State_____



Photos courtesy Thompson Wire Company



Above (right)—In this continuous installation, strip steel is treated with Bonderite, then with Bonderlube lubricant. *Below*, treated strip is re-coiled as it comes out of the machine, Bonderite-Bonderlube treated.

Successive steps in forming a small case from Bonderite and Bonderlube treated strip.

For better performance in the forming dies . . .

Get steel strip, mill-treated with

BONDERITE *and* BONDERLUBE

Here's a service that can mean real savings in your cold forming operations. Buy mill-treated steel, in coils, treated with Bonderite and Bonderlube and ready for the dies.

This specially treated strip, with its Bonderite-Bonderlube coating, is used for many products and components made by cold forming. The combination of Bonderite and Bonderlube provide such effective lubrication that severe deformations are possible without marring surface finish. Tools and dies last longer, production may be greatly increased, production costs are reduced.

Investigate mill-treated steel strip with Bonderite and Bonderlube. Ask your strip supplier about this new development.

**Bonderite, Bonderlube, Parco, Parco Lubrite, Parker Pre-Namel—Reg. U.S. Pat. Off.*

Since 1914—leader in the field

PARKER RUST PROOF COMPANY

2159 E. MILWAUKEE, DETROIT 11, MICHIGAN

BONDERITE	BONDERITE and BONDERLUBE	PARCO COMPOUND	PARCO LUBRITE	TROPICAL
corrosion resistant paint base	aids in cold forming of metals	rust resistant	wear resistant for friction surfaces	heavy duty maintenance paints since 1883

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+5.25	+23.25	1.25	+17.5	3.75	+15	5.25	+13.5	5.25	+13.5	5	+13.75	7.5	+11.25
Ambridge, Pa. N2	+5.25	....	1.25	....	3.75	....	5.25	....	5.25	....	5	....	7.5	....
Lorain, O. N3	+5.25	+23.5	1.25	+17.5	3.75	+15	5.25	+13.5	5.25	+13.5	5	+13.75	7.5	+11.25
Youngstown Y1	+2.75	+20.75	1.25	+17.5	3.75	+15	5.25	+13.5	5.25	+13.5	5	+13.75	7.5	+11.25

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+5.25	+23.5	1.25	+17.5	3.75	+15	5.25	+13.5	5.25	+13.5	5	+13.75	7.5	+11.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25
Alton, Ill. L1	....	....	....	....	....	....	10.5	+3.75	13.5	+4.75	16	+1.25	18.5	0.5
Benwood, W. Va. W10	6.25	+24	+4.75	+32.25	+14.75	+42.25	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25
Butler, Pa. F6	7.5	+23	+3	+30.5	+12.5	+40	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25
Fairless, Pa. N3	....	....	....	....	....	....	7.25	+12	10.25	+8	13.75	+3.5	16.25	+1.75
Fontana, Calif. K1	....	....	....	....	....	....	+3.75	+23	+0.75	+19	2.75	+14.5	5.25	+12.75
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	8.25	+11	11.25	+7	14.75	+2.5	17.25	+0.75
Lorain, O. N3	....	....	....	....	....	....	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25
Sharon, Pa. S4	7.5	+23	+3	+30.5	+12.5	+40	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25
Sparrows Pt., Md. B2	5.5	+25	+0.5	+32.5	+14.5	+42	7.5	+12	10.25	+8	13.75	+3.5	16.25	+1.75
Wheatland, Pa. W9	7.5	+23	+3	+30.5	+12.5	+40	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25
Youngstown R2, Y1	....	....	....	....	....	....	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	....	....	....	....
Alton, Ill. L1	19	1.5	19.5	2	21	2.75	21	2.75	....	....	....	....
Benwood, W. Va. W10	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	10.25	+8.5	10.25	+8.5
Etna, Pa. N2	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	10.25	+8.5	10.25	+8.5
Fairless, Pa. N3	16.75	+0.75	17.25	+0.25	18.75	0.5	18.75	0.5	8.25	+10.5	8.25	+10.5
Fontana, Calif. K1	5.75	+11.75	6.25	+11.25	7.75	+10.5	7.75	+10.5	+2.75	+21.5	+2.75	+21.5
Indiana Harbor, Ind. Y1	17.75	0.25	18.25	0.75	19.75	1.5	19.25	1.5	9.25	+9.5	9.25	+9.5
Lorain, O. N3	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	....	....	....	....
Sharon, Pa. M6	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	....	....	....	....
Sparrows Pt., Md. B2	16.75	+0.75	17.25	+0.25	18.75	0.5	18.75	0.5	8.25	+10.5	8.25	+10.5
Wheatland, Pa. W9	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	10.25	+8.5	10.25	+8.5
Younstown R2, Y1	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	10.25	+8.5	10.25	+8.5

*Galvanized pipe discounts based on current price of zinc (13.50c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	Wire Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	21.25	26.00	....	34.50	....	40.50	42.50	46.75	43.25
202	22.75	29.00	35.00	37.50	39.25	41.25	43.25	47.25	47.25
301	22.25	27.00	35.75	35.75	40.25	42.50	44.50	49.25	45.75
302	24.25	30.25	36.50	39.00	41.00	43.25	45.50	50.00	50.00
302B	24.50	31.50	39.25	44.00	43.25	45.50	47.50	54.75	54.75
303	....	30.75	39.50	....	44.00	46.25	48.00	54.50	54.50
304	26.00	32.00	39.00	42.50	43.75	46.00	48.75	53.25	53.25
304L	....	....	46.50	49.50	51.25	53.50	56.25	60.75	60.75
305	27.50	35.25	40.75	45.75	43.75	46.00	49.25	56.50	56.50
308	29.50	36.75	45.50	48.25	50.75	53.50	58.00	60.50	60.50
309	38.25	47.50	55.50	62.00	61.25	64.50	68.25	77.50	77.50
310	47.75	59.25	75.00	81.00	83.25	87.50	89.25	93.00	93.00
314	....	....	....	....	83.25	....	80.25	....	100.50
316	38.25	47.50	59.75	66.50	66.75	70.25	73.75	78.25	78.25
316L	....	....	67.25	73.00	74.25	77.75	81.25	85.75	85.75
317	46.25	57.75	73.75	84.75	83.00	87.25	90.00	97.00	97.00
321	31.00	38.50	45.25	51.50	50.50	53.25	57.50	63.00	63.00
18-8 CbTa	35.50	44.75	53.50	61.00	59.25	62.25	67.00	76.25	76.25
403	....	....	30.75	....	34.50	36.25	38.75	46.50	46.50
405	18.75	24.50	28.50	34.50	32.50	34.00	36.00	45.00	45.00
410	16.00	20.75	27.25	29.75	31.00	32.50	33.75	38.75	38.75
416	....	....	27.75	....	31.50	33.00	34.75	46.50	46.50
420	....	32.25	33.00	40.25	37.75	39.75	43.50	59.50	59.50
430	16.25	21.00	27.75	30.75	31.50	33.00	34.50	39.25	39.25
430F	....	....	28.25	....	32.00	33.50	35.25	49.75	49.75
431	....	27.75	36.25	....	40.50	42.50	44.25	53.75	53.75
446	....	....	37.75	56.75	42.50	44.75	46.00	67.25	67.25

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Div., H. K. Porter Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U.S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Elwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McInnes Steel Co.; McLouth Steel Corp.; Metal Forming Corp.; National-Standard Co.; National Tube Div., U.S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

	Plates 5%	Plates Carbon Base 10%	Plates Carbon Base 15%	Plates Carbon Base 20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	35.50
304	33.15	36.20	40.30	44.50	37.75
304-L	35.40	38.80	43.15	47.65	....
316	38.35	41.60	45.90	50.15	55.50
316-L	43.55	47.60	52.70	57.85	....
316-Cb	43.85	48.10	53.40	58.75	....
321	34.90	37.95	42.10	46.40	44.75
347	37.05	41.25	46.45	51.70	54.25
405	27.55	29.20	33.15	37.05	....
410	27.00	28.70	32.65	36.55	....
430	27.00	28.70	32.65	36.55	....
Inconel	47.28	57.90	68.50	79.20	....
Nickel	40.00	50.30	60.65	71.05	....
Nickel, Low Carbon	40.30	50.95	61.65	72.50	....
Monel	41.70	51.90	62.15	72.40	....
Copper*	....	....	....	....	46.00

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	33.50	40.85

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb
Regular Carbon	0.290
Extra Carbon	0.345
Special Carbon	0.41-0.45
Oil Hardening	0.450

Grade	$ per lb
Cr Hot Work	0.45-0.495
W-Cr Hot Work	0.043-0.475
V-Cr Hot Work	0.460
Hi-Carbon-Cr	0.830

Grade by Analysis (%) W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	....	4.170
18.25	4.25	1	4.75	....	2.385
18	4	2	9	....	2.755
18	4	2	....	....	1.845
18	4	1	....	....	1.680
9	3.5	..	....	....	1.275
13.5	4	3	....	....	1.945
13.75	3.75	2	5	....	2.325
6.4	4.5	1.9	....	5	1.185
6	4	3	....	6	1.430
1.5	4	1	....	8.5	1.040

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

Birmingham District	Basic	No. 2 Foundry	Malle-able	Besse-mer
AlabamaCity,Ala. R2	58.50	59.00	....	....
Birmingham R2	58.50	59.00‡	....	....
Birmingham U6	....	59.00‡	63.00	....
Woodward,Ala. W15	58.50**	59.00‡	63.00	....
Cincinnati, deld.	....	66.70	....	....
Buffalo District				
Buffalo H1, R2	62.50	63.00	63.50	64.00
Tonawanda,N.Y. W12	62.50	63.00	63.50	64.00
N.Tonawanda,N.Y. T9	....	63.00	63.50	64.00
Boston, deld.	73.79	74.29	74.79	....
Rochester,N.Y., deld.	65.52	66.02	66.52	....
Syracuse,N.Y., deld.	66.62	67.12	67.62	....
Chicago District				
Chicago I-3	62.50	63.00	63.00	63.50
Gary,Ind. U5	62.50	....	63.00	....
S.Chicago,Ill. R2	62.50	....	63.00	....
S.Chicago,Ill. Y1	62.50	63.00	63.00	....
S.Chicago,Ill. U5	62.50	....	63.00	63.50
S.Chicago,Ill. W14	62.50	....	63.00	63.50
Milwaukee, deld.	64.96	65.46	65.46	65.96
Muskegon,Mich., deld.	....	76.83	76.83	....
Cleveland District				
Cleveland R2, A7	62.50	63.00	63.00	63.50
Akron,O., deld.	65.62	66.12	66.12	66.62
Mid-Atlantic District				
Birdsboro,Pa. B10	64.50	65.00	65.50	66.00
Chester,Pa. P4	64.50	65.00	65.50	....
Philadelphia, deld.	66.26	66.76	67.26	....
Swedeland,Pa. A3	64.50	65.00	65.50	66.00
New York, deld	....	71.20	71.70	....
Newark,N.J., deld.	68.52	69.02	69.52	70.02
Philadelphia, deld.	66.38	66.88	67.38	67.88
Troy,N.Y. R2	64.50	65.00	65.50	66.00
Pittsburgh District				
NevilleIsland,Pa. P6	62.50	63.00	63.00	63.50
Pittsburgh (N&S sides), Aliquippa, deld.	....	64.45	64.45	64.98
McKeesRocks,Pa., deld	....	64.10	64.10	64.63
Lawrenceville, Homestead, Wilmerding, Monaca,Pa. deld...	....	64.76	64.76	65.29
Vernoa, Trafford, Pa. deld.	64.79	65.32	65.32	65.85
Brackenridge,Pa. deld.	65.10	65.60	65.60	66.13
Bessemer,Pa. U5	62.50	....	63.00	63.50
Clairton,Rankin,S.Duquesne,Pa. U5	62.50	....	....	....
Midland,Pa. C18	62.50	....	....	....

Youngstown District	Basic	No. 2 Foundry	Malle-able	Besse-mer
Hubbard,O. Y1	....	....	63.00	....
Sharpsville,Pa. S6	62.50	....	63.00	63.50
Youngstown Y1	....	....	63.00	63.50
Mansfield,O., deld.	67.40	....	67.90	68.40
Duluth I-3	62.50	63.00	63.00	63.50
Erie,Pa. I-3	62.50	63.00	63.00	63.50
Everett,Mass. E1	64.50	65.00	65.50	....
Fontana,Calif. K1	70.50	71.00	....	....
Geneva,Utah C11	62.50	63.00	....	....
GraniteCity,Ill. G4	64.40	64.90	65.40	....
Ironton,Utah C11	62.50	63.00	....	....
LoneStar,Tex. L6	58.50*	59.00†	....	....
Minnequa,Colo. C10	64.50	65.00	65.50	....
Rockwood,Tenn. T3	....	59.00‡	63.00	....
Toledo,O. I-3	62.50	63.00	63.00	63.50
Cincinnati, deld.	69.04	69.54	....	....

*Phos. 0.51-0.75%; Phos. 0.31-0.50%, $59.50.
**Phos. 0.70-0.90%; Phos. 0.30-0.60%, $59.50.
†Phos. 0.51-0.75%; Phos. 0.31-0.50%, $60.
‡Phos. 0.70-0.90%; Phos. 0.30-0.50%, $60.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1.25 for each 0.5% Si; 75 cents for each 0.50% Mn over 1%)

Jackson,O. I-3, J1	71.50
Buffalo H1	72.75

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity, Ky. P15	$105.50
NiagaraFalls,N.Y. P15	105.50
Keokuk,Iowa, Open-hearth & Fdry, freight allowed K2	110.00
Keokuk, O.H. & Fdry, 12½ lb piglets, 16% Si, frgt allowed K2	113.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	$76.50
Rockwood,Tenn. T3 (Phos. 0.035% max)	76.50
Troy,N.Y. R2 (Phos. 0.035% max)	70.50
Philadelphia, deld.	78.26
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	67.50
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	67.50
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	67.50
NevilleIsland,Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	67.50

Warehouse Steel Products

Representativ prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents; Atlanta, Houston, Seattle no charge.

	SHEETS				STRIP	BARS				Standard	PLATES	
	Hot-Rolled	Cold-Rolled	Galv. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Mer-chant Qual.	H.R. Spec. Qual.	C.F. Rds.‡	H.R. Alloy 4140††§	Structural Shapes	Carbon	Floor
Atlanta	8.17‖	9.37‖	9.83‖	....	8.21	8.30	...	10.23	....	8.59	8.55	10.51
Baltimore	7.88	8.98	9.12	....	8.36	8.53	...	9.13§	14.68	8.75	8.26	9.76
Birmingham	7.80‖	9.00‖	9.52‖	....	7.82	7.91	8.44	10.12	....	8.20	8.16	10.08
Boston	8.84	9.88	11.06	....	8.89	9.07	...	10.71	14.49	9.10	9.18	10.68
Buffalo	7.85	9.00	10.75	....	8.05	8.00	8.70	8.70	14.35	8.50	8.50	10.05
Chattanooga	8.00‖	9.20‖	9.10‖	....	8.05	8.13	8.66	10.04	....	8.42	8.38	10.02
Chicago	7.80	9.00	9.70	....	7.82	7.91	8.44	8.35	13.95	8.20	8.16	9.49
Cincinnati	7.94	9.05	9.75	....	8.14	8.22	8.75	8.84	14.26	8.74	8.52	9.78
Cleveland	7.78	8.98	9.60	....	7.92	7.99	8.52	8.60	14.04	8.57	8.39	9.72
Denver	9.55	11.09	12.41	....	9.70	9.75	...	10.54	18.89	9.60	9.50	11.15
Detroit	8.03	9.25	10.05	....	8.17	8.21	8.74	8.68	14.21	8.74	8.51	9.74
Erie, Pa.	7.75	8.88	9.60[10]	....	7.90	8.00	8.65	8.70[10]	....	8.35	8.20	9.50
Houston	8.70	9.65	10.99	....	8.80	8.95	9.50	10.55	15.00	8.90	8.60	10.10
Jackson, Miss.	8.10‖	9.30‖	9.79‖	....	8.15	8.23	8.76	10.23	....	8.52	8.48	10.11
Los Angeles	9.10	10.80	11.65	....	9.15	8.80	9.50	11.70	15.35	9.15	9.65	11.80
Milwaukee	7.93	9.13	9.83	....	7.95	8.04	8.57	8.58	14.08	8.41	8.29	9.62
Moline, Ill.	8.05	9.25	10.05	....	8.13	8.26	...	8.70	....	7.78	8.36	...
New York	8.45	9.66	10.23	60.20	8.90	8.86	9.41	10.65	14.39	8.91	9.01	10.31
Norfolk, Va.	8.05	...	...	....	8.55	8.60	...	10.80	....	8.95	8.45	9.95
Philadelphia	8.15	9.07	10.29	....	8.82	8.71	...	9.31	14.31	8.70	8.68	9.70
Pittsburgh	7.78	8.99	10.05	50.00	7.92	7.91	8.44	8.60	13.95	8.20	8.16	9.49
Portland, Oreg.	8.90	9.65	11.40	....	9.05	8.95	....	13.55	14.60	8.90	8.70	11.60
Richmond, Va.	8.00	...	10.14	....	8.55	8.40	8.92	10.00	....	8.95	8.40	9.90
St. Louis	8.14	9.34	10.06	....	8.19	8.28	8.81	8.96	14.31	8.67	8.52	9.86
St. Paul	8.29	9.49	10.31	....	8.43	8.52	...	9.21	....	8.94	8.90	9.87
San Francisco	8.95	10.30	10.80	....	8.95	8.80	9.35	12.30	15.35	9.05	9.20	11.45
Seattle	9.55	10.70	11.65	....	9.55	9.30	9.85	13.30	15.65	9.35	9.30	11.40
Spokane, Wash.	9.55	10.70	11.65	....	9.55	9.30	9.85	13.30	16.40	9.35	9.30	11.40
Washington	8.48	9.58	....	....	9.06	8.98	...	9.73	....	9.35	8.86	10.36

*Prices do not include gage extras; †prices include gage and coating extras (based on 12.50c zinc at Los Angeles and 13.50c at other points), except in Birmingham (coating extra excluded); ‡includes 35-cent bar quality extras; **⅛-in. and heavier; ††as annealed; ‖42 in. and under.

Base quantities, 2000 to 4999 lb except as noted; cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 8000 lb except in Chicago, New York and Boston, 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb; [3]—400 to 999 lb; [8]—1000 to 1999 lb; [9]—2000 to 3999 lb; [10]—2000 lb and over.

Refractories

(Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beach Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $128; Salina, Pa., $133; Niles, O., $138; Cutler, Utah, $148.

Super-Duty: Ironton, O., Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Pa., New Savage, Md., St. Louis, $165; Stevens Pottery, Ga., $175.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, O., Hawstone, Pa., $140; Warren, Niles, Windham, O., Hays, Latrobe, Morrisville, Pa., $145; E. Chicago, Ind., Joliet, Rockdale, Ill., $150; Lehigh, Utah, $165; Los Angeles, $170.

Super-Duty: Hays, Sproul, Hawstone, Pa., Niles, Warren, Windham, O., Leslie, Md., Athens, Tex., $157; Morrisville, Latrobe, Pa., $160; Curtner, Calif., $182.

Semisilica Brick (per 1000)

Clearfield, Pa., $145; Woodbridge, N. J., $128; Philadelphia, $130.

Ladle Brick (per 1000)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, O., $96; Clearfield, Pa., Portsmouth, O., $98.

High-Alumina Brick (per 1000)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $220; Danville, Ill., $223; Philadelphia, Clearfield, Pa., $230.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $275; Danville, Ill., $278; Philadelphia, Clearfield, Pa., $285.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $315; Danville, Ill., $318; Philadelphia, Clearfield, Pa., $325.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $177; Clearfield, Pa., $189.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $292; Clearfield, Pa., $311.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $221; Clearfield, Pa., $236.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, O., Gibsonburg, Narlo, O., $16; Thornton, McCook, Ill., $16.35; Dolly Siding, Bonne Terre, Mo., $15.

Magnesite (per net ton)

Domestic, dead-burned, bulk ½-in. grains with fines: Chewelah, Wash., Luning, Nev. $43; ⅜-in. grains with fines: Baltimore, $69.40.

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $38-39; 70%, $35-36; 60%, $31-32. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $34; Mexican, $26.50.

Ores

Lake Superior Iron Ore

(Prices effective for the 1957 shipping season, gross tons, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old range bessemer	11.85
Old range nonbessemer	11.70
Open-hearth lump	12.70
High phos.	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 30, 1957, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, foundry and basic 62-64% concentrates	25.00-27.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	27.00-27.50
N. African hematite (spot)	nom. 24.00-25.00
Brazilian iron ore, 68-69%	35.00-36.00

Tungsten Ore

Net ton unit, before duty

Foreign, wolframite, good commercial quality	$27.00-28.00
Domestic, concentrates, mine	55.00

Manganese Ore

Mn 46-48%, Indian (export tax included), $1.60-1.70 per long ton unit, c.i.f. U.S. ports, duty for buyer's account; other than Indian, $1.45-1.50; contracts by negotiation.

Chrome Ore

Gross ton f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$54.00-57.00
48% 2.8:1	51.00-54.00
48% no ratio	43.00-45.00

South African Transvaal

48% no ratio	$37.50-39.00
44% no ratio	26.00-27.00

Turkish

48% 3:1	$60.00-63.00

Domestic

Rail nearest seller

18% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb of Mo content, mines, unpacked	$1.18

Antimony Ore

Per unit of Sb content, c.i.f. seaboard

55-60%	$3.20-3.65
60-65%	3.65-3.75

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

Metallurgical Coke

Price per net ton
Beehive Ovens

Connellsville, furnace	$14.75-15.75
Connellsville, foundry	17.50-18.50

Oven Foundry Coke

Birmingham, ovens	$28.85
Cincinnati, deld.	33.78
Buffalo, ovens	30.50
Camden, N. J., ovens	29.50
Detroit, ovens	30.50
Pontiac, deld.	32.25
Saginaw, deld.	33.83
Erie, Pa., ovens	30.50
Everett, Mass., ovens New England, deld.	31.55*
Indianapolis, ovens	29.75
Ironton, O., ovens	29.00
Cincinnati, deld.	29.27
Kearny, N. J., ovens	30.00
Lone Star, Tex., ovens	25.50
Milwaukee, ovens	30.50
Painesville, O., ovens	30.50
Cleveland, deld.	32.89
Philadelphia, ovens	29.50
St. Louis, ovens	31.50
Neville Island (Pittsburgh), Pa., ovens	29.25
St. Paul, ovens	29.75
Chicago, deld.	33.14
Swedeland, Pa., ovens	29.50
Terre Haute, Ind., ovens	29.75

*Or within $4.55 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzene	36.00
Toluene, one deg.	32.00-34.00
Industrial xylene	32.00-35.00

Per ton, bulk, ovens

Ammonium sulfate	$32.00

Cents per pound, producing point

Phenol: Grade 1, 15.00; Grade 2-3, 14.50; Grade 4, 16.50; Grade 5, 15.25.

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge iron:	
Swedish, c.i.f. Camden, N.J., c.l. in bags	8.50
Domestic:	
F.o.b., Johnstown, Pa., Niagara Falls, N. Y., in bags	9.50
F.o.b., Riverton, N. J., in bags	8.50
Canadian, f.o.b. shipping point	9.50
Electrolytic iron:	
Melting stock, 99.9% Fe, irregular fragments of ⅛ in. x 1.3 in.	26.00
Annealed, 99.5% Fe	36.50
Unannealed (99+ % Fe)	34.00
Unannealed (99+ % Fe) (minus 325 mesh)	59.00
Powder Flakes (minus 16, plus 100 mesh)	29.00
Carbonyl Iron:	
98.1-99.9%, 3 to 20 microns, depending on grade, $6.00-275.00, in standard 200-lb containers; all minus 200 mesh.	
Aluminum:	
Atomized, 500 lb drum, frght allowed	
Carlots	36.20
Ton lots	37.20
Antimony, 500 lb lots	32.00*
Brass, 5000-lb lots	36.80-46.80†
Bronze, 5000-lb lots	56.20-60.00†
Copper:	
Electrolytic	14.25*
Reduced	14.25*
Lead	7.50*
Manganese:	
Minus 35 mesh	64.00
Minus 100 mesh	70.00
Minus 200 mesh	75.00
Nickel, unannealed	$1.05
Nickel-Silver, 5000-lb lots	56.10-60.10†
Phosphor-Copper, 5000-lb lots	66.00
Copper (atomized) 5000-lb lots	48.50-56.00‡
Silicon	47.50
Solder	7.00*
Stainless Steel, 304	$1.05
Stainless Steel, 316	$1.40
Tin	14.50*
Zinc, 5000-lb lots	19.75-33.00‡
Tungsten: Melting grade, 99%	Dollars
60 to 2000 mesh: 1000 lb and over	4.20
Less than 1000 lb	4.35
Chromium, electrolytic 99.8% Cr min metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 20% Zn, 10% Ni. **64% Cu, 18% Zn, 18% Ni.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Inches Diam.	Length	Per 100 lb
2	24	$57.75
2½	30	37.25
3	40	35.25
4	40	33.25
5⅛	40	33.00
6	60	30.00
7	60	26.75
8, 9, 10	60	26.50
12	72	25.50
14	60	25.50
16	72	24.50
17	60	25.50
18	72	24.50
20	72	24.00
24	84	24.75

CARBON

8	60	13.30
10	60	13.00
12	60	12.95
14	60	12.85
14	72	11.95
17	60	11.85
17	72	11.40
20	84	11.40
20	90	11.00
24	72, 84	11.25
24	96	10.95
30	84	11.05
40, 35	110	10.70
40	100	10.70

Imported Steel

(Base per 100 lb, landed, duty paid, based on current ocean rates. Any increase in these rates is for buyer's account. Source of shipment: Western continental European countries)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$7.15	$7.15	$7.15	$7.40
Bar Size Angles	7.11	7.11	7.11	7.26
Structural Angles	7.30	7.30	7.30	7.60
I-Beams	7.75	7.75	7.75	8.15
Plates (basic bessemer)	9.30	9.30	9.30	9.70
Sheets, H.R.	8.55	8.55	8.55	8.85
Sheets, C.R. (drawing quality)	8.95	8.95	8.95	9.35
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	27.17	27.17	27.17	27.64
Barbed Wire (†)	6.80	6.80	6.80	7.25
Merchant Bars	7.15	7.15	7.15	7.50
Hot-Rolled Bands	7.25	7.25	7.25	7.65
Wire Rods, Thomas Commercial No. 5	6.38	6.38	6.38	6.78
Wire Rods, O-H Cold Heading Quality No. 5	6.72	6.72	6.72	7.12
Bright Common Wire Nails (§)	8.45	8.45	8.45	8.57
Oil Country Pipe: Mills withdrawn temporarily.				

†Per 82-lb. net, reel. §Per 100-lb kegs, 20d nails and heavier.

Record Shipments

Of some finished steel products chalked up in 1956—Over-all tonnage movement off slightly

December shipments of 7,064,093 net tons of finished steel brought the total 1956 movement to 83,251,168 net tons, exceeded only by the record 84,717,444 tons reported in 1955, according to the American Iron & Steel Institute.

Records were chalked up for six products, three being used in construction — heavy structural shapes, 5,348,981 tons; concrete reinforcing bars, 2,518,691; steel piling, 434,103. Other records were set in oil country goods, 2,560,223 tons; electrolytic tin plate, 4,615,068; galvanized sheets, 2,957,991.

The total movement of sheets and strip was 29,446,273 tons, down 2,906,773 from the 32,353,046 moved in 1955. Pipe and tubing (including oil country goods) 10,198,428 tons, a record.

Seven Records — Shipments to seven market classifications set records: Warehouses and distributors (other than oil and gas warehouses) 14,505,049 net tons; construction, including maintenance (other than oil and gas) 7,885,090; contractors' products, 4,074,577; oil and gas, 5,581,934; machinery, industrial equipment and tools, 5,031,599; electrical machinery and equipment, 2,437,804; containers, 6,818,361.

The automotive industry's take, 14,141,887 net tons, was off sharply from the 18,721,880 in 1955.

Among the largest consuming categories last year, warehouses and distributors (including oil and gas) ranked first, accounting for 21 per cent of total domestic shipments. The next largest classification was automotive, its take amounting to 17.8 per cent.

Heavy—Construction, including maintenance, took 13.1 per cent. If contractors' products are added to construction, the industry's take was 18.2 per cent. Containers accounted for 8.6 per cent; machinery, industrial equipment and tools, 6.3 per cent; rail transportation, 5.3 per cent.

Exports were 3,622,427 tons, up slightly from 3,583,077.

Steel Shipments By Market Classifications—1956

(All Grades; Net Tons)

Market Classifications	December	Per Cent of Domestic Shipments	12 Months	Per Cent of Domestic Shipments
Converting, Processing	151,856	2.3	3,776,559	4.7
Forgings	117,891	1.8	1,473,186	1.8
Bolts, nuts, etc.	134,086	2.0	1,485,087	1.9
Warehouses:				
Oil and gas	211,765	3.2	2,247,184	2.8
All other	1,206,275	18.2	14,505,049	18.2
Total	1,418,040	21.4	16,752,233	21.0
Construction, Maintenance:				
Rail transportation	4,038	0.1	65,959	0.1
Oil and gas	261,338	3.9	2,556,036	3.2
All other	758,022	11.4	7,819,131	9.8
Total	1,023,398	15.4	10,441,126	13.1
Contractors' Products	295,808	4.5	4,074,577	5.1
Automotive:				
Passenger cars, etc.	1,388,363	20.9	13,744,303	17.3
Forgings	33,831	0.5	397,584	0.5
Total	1,422,194	21.4	14,141,887	17.8
Rail transportation:				
Rails, trackwork, etc.	138,386	2.1	1,590,013	2.0
Cars, locomotives	236,327	3.5	2,604,447	3.3
Street railways, etc.	4,230	0.1	32,194	...
Total	378,943	5.7	4,226,654	5.3
Shipbuilding, etc.	76,169	1.1	760,306	1.0
Aircraft	12,403	0.2	134,721	0.2
Oil, gas drilling	61,355	0.9	778,714	1.0
Mining, quarrying, etc.	25,346	0.4	349,508	0.4
Agricultural:				
Machinery	78,467	1.2	818,731	1.0
Other agricultural	14,746	0.2	263,728	0.3
Total	93,213	1.4	1,082,459	1.3
Machinery, etc.	436,783	6.6	5,031,599	6.3
Elec. machinery, etc.	193,086	2.9	2,437,804	3.1
Appliances, etc.	146,588	2.2	2,129,115	2.7
Other equipment	157,358	2.4	2,263,775	2.8
Containers:				
Cans and closures	254,127	3.8	5,025,825	6.3
Barrels, etc.	75,969	1.1	1,018,873	1.3
All other	58,021	0.9	773,663	1.0
Total	388,117	5.8	6,818,361	8.6
Ordnance & other military	37,779	0.6	523,890	0.7
Shipments of nonreporting companies	69,218	1.0	947,180	1.2
Total domestic shipments	6,639,631	100.0	79,628,741	100.0
Exports	424,462	xxx	3,622,427	xxxx
Total Shipments	7,064,093	xxxx	83,251,168	xxxx

Shipments of Finished Steel Products—1956

(All Grades; Net Ton)

Products	December Tonnage Carbon	Alloy	Stainless	Total for Year 1956	1955
Ingots, etc.	38,711	18,736	1,625	702,744	678,630
Blooms, slabs, etc	159,347	45,347	3,127	2,275,640	2,744,477
Tube rounds	992	193	2	12,530	NA
Skelp	25,107	.....	.....	197,825	191,591
Wire rods	103,220	1,783	524	1,132,434	1,203,842
Structurals (heavy)	509,607	4,784	11	5,348,981	4,736,987
Steel piling	49,150	.....	.....	434,103	391,348
Plates	556,965	45,671	4,278	7,714,623	6,762,258
Rails—standard	124,706	.....	.....	1,201,354	1,150,977
Rails—all other	6,335	.....	.....	98,362	82,767
Joint bars	5,624	.....	.....	81,557	68,314
Tie plates	26,915	.....	.....	298,201	311,411
Track spikes	5,321	.....	.....	93,467	93,097
Wheels (rolled & forged)	29,367	61	.....	348,396	306,406
Axles	15,791	3	.....	171,780	119,246
Bars—hot rolled	623,437	158,213	6,320	8,840,349	8,798,261
Bars—reinforcing	240,072	415	.....	2,518,691	2,164,641
Bars—cold drawn	100,449	22,681	5,472	1,736,369	1,877,961
Tool steel	1,214	7,458	.....	125,866	114,529
Standard pipe	245,324	66	.....	2,927,308	2,968,241
Oil country goods	199,057	32,931	.....	2,560,223	2,542,109
Line pipe	330,565	3	.....	3,376,063	3,083,736
Mechanical tubing	51,102	20,195	410	949,846	965,829
Pressure tubing	27,459	5,575	2,029	384,988	276,068
Wire—drawn	209,556	4,073	2,255	2,988,377	3,192,678
Nails & staples	28,893	.....	.....	557,283	650,956
Barbed wire	3,232	.....	1	74,318	113,372
Woven fence	13,118	.....	.....	273,352	312,158
Bale ties	1,687	.....	.....	49,672	60,389
Black plate	48,281	.....	.....	765,055	797,720
Tin plate—hot dipped	68,385	.....	.....	950,070	1,100,762
Tin plate—electrolytic	288,896	.....	.....	4,615,068	4,503,637
Sheets—hot rolled	781,224	42,271	2,228	8,790,540	9,430,711
Sheets—cold rolled	1,110,517	4,602	15,149	13,317,002	15,167,629
Sheets—galvanized	239,173	.....	.....	2,957,991	2,864,497
Sheets—other coated	15,335	.....	.....	226,556	275,046
Sheets—enameling	Data not available. Included in figures for cold-rolled sheets				
Electrical sheets & strip	8,679	54,628	.....	813,381	791,043
Strip—hot rolled	152,244	2,315	669	1,796,157	2,089,491
Strip—cold rolled	83,113	1,532	18,291	1,544,646	1,734,629
Total Shipments (1956)	6,528,170	473,536	62,387	83,251,168	84,717,444
Total Shipments (1955)	6,970,165	549,896	60,882	xxxxxxx	84,717,444

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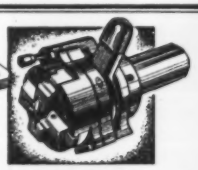

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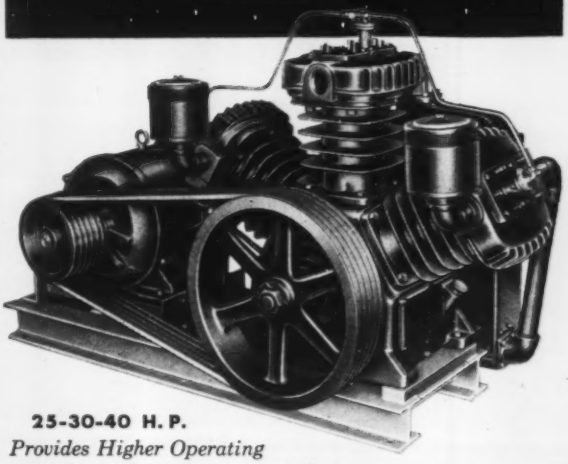

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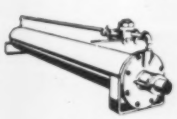

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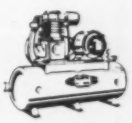

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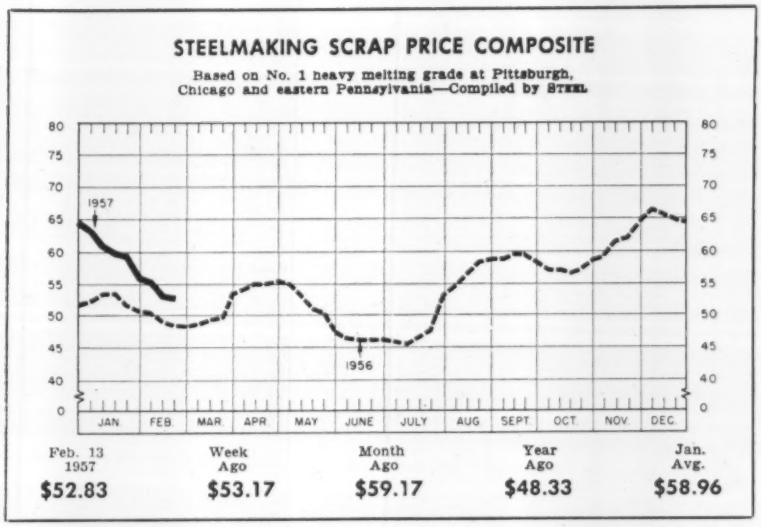


Scrap Price Decline Slowing Up

Prices still slipping, STEEL's index at $52.83 being off another 34 cents. Market is displaying a slightly firmer tone despite the absence of large buying

Scrap Prices, Page 154

Pittsburgh—No. 1 heavy melting scrap is stable at present prices though there have been no major buys the past week to test the market. Several minor changes in turnings and borings, cast iron and railroad grades saw prices move in a narrow range. Cast grades are slightly weaker.

Philadelphia—Steel scrap prices are unsettled, with the No. 1 grades holding at $56-$58, delivered; No. 2 heavy melting at $48-$48.50; and No. 2 bundles at $46-$46.50. Heavy turnings are off nominally to $52-$54, delivered. Couplers, springs and wheels are easier at $69-$70, delivered; and rail crops (2-ft and under) at $80. All other grades, including cast, are unchanged.

The longshoremen's strike is delaying the movement of export scrap. Most tonnages scheduled to leave this port in February (about 3.5 cargoes) are being deferred until March, when additional tonnages are scheduled to be shipped.

Accumulations for shipment abroad are accounting largely for the relative strength of the market here on open-hearth material, compared with some of the inland markets.

New York—Scrap brokers have reduced buying prices $2 a ton on the major open-hearth grades. They are quoting $51-$52 on No. 1 heavy melting and No. 1 bundles; $43-$44 on No. 2 heavy melting; and $41-$42 on No. 2 bundles. They also have dropped buying prices $1 on short shoveling turnings to $36-$37 and low phos structurals and plate $1 to $57-$58.

Boston — Heavy melting steel grades of scrap are quoted down $1 a ton, with brokers paying $47, shipping point, for No. 1 heavy melting and bundles. Buying for district consumption and delivery at dock for export is slower. No. 1 cupola cast is off $2 a ton.

San Francisco — Steel scrap prices are holding following the recent reductions in the list. Supplies appear to be adequate.

Cleveland — Pending closing of the automotive lists at the end of the month, the scrap market here and in the Valley is quiet. In the absence of new buying, here and in the Valley, prices are unchanged but nominal. Dealers' stocks are reported to be limited.

Chicago — Price reductions on scrap last week were the fewest in the last several weeks. This does not necessarily indicate the bottom has been reached, but it does suggest a leveling off may be in process. Since December, some important grades have declined $20 a ton. A slight firming trend can be detected. A leading mill announced its new buying prices. Its offer of industrial No. 1 heavy melting steel of $52 a ton was $2 above the price another mill had been paying for the same material. For No. 1 factory bundles, the $53 offer is $1 below recent purchases. Blast furnace and cast grades are steady.

St. Louis — The scrap market here firmed up somewhat last week. Price declines were reported on only a few railroad grades, ranging from $2 to $6 a ton. Brokers are encountering difficulty in placing orders because of the low prices offered and bad weather which is hampering collections. Mill buying is limited.

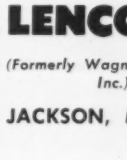
Buffalo—A soft tone continues

(*Please turn to page* 159)

Here's Just 3 Reasons Why So Many Welders Have Switched

- Wrap around Glass Fibre Tip Insulation—30% *more* heat resistance than any other make!
- Brilliant Red Tips and Trigger—Bright Yellow Handle—all Glass Fibre, an outstanding Safety Feature!
- Body completely insulated—no bare spots!

HI-AMP®
ELECTRODE HOLDERS
are the most economical to buy and maintain too!



Just ask any Welding Supply Dealer anywhere for PROOF of the above statements.

LENCO, INC.
(Formerly Wagner Mfg. Co. Inc.)
JACKSON, MISSOURI

Weld with HI-AMP

Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Feb. 20	$52.83
Feb. 13	53.17
Jan. Avg.	58.96
Feb. 1956	48.96
Feb. 1952	43.00

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	53.00-54.00
No. 2 heavy melting	47.00-48.00
No. 1 bundles	53.00-54.00
No. 2 bundles	42.00-43.00
No. 1 busheling	53.00-54.00
Machine shop turnings	*39.00-40.00*
Mixed borings, turnings	*39.00-40.00*
Short shovel turnings	*43.00-44.00*
Cast iron borings	*43.00-44.00*
Cut structurals, 3 ft. lengths	*57.00-58.00*
Cut structurals, 2 ft. and under	*59.00-60.00*
Heavy turnings	*48.00-49.00*
Punchings & plate scrap	*57.00-58.00*
Electric furnace bundles	*57.00-58.00*

Cast Iron Grades

No. 1 cupola	*50.00-51.00*
Heavy breakable cast	*48.00-49.00*
Unstripped motor blocks	*38.00-39.00*
No. 1 machinery cast	*58.00-59.00*

Railroad Scrap

No. 1 R.R. heavy melt.	56.00-57.00
Rails, 2 ft and under	70.00-71.00
Rails, 18 in. and under	71.00-72.00
Rails, random lengths	*68.00-69.00*
Railroad specialties	*67.00-68.00*

Stainless Steel Scrap

18-8 bundles & solids	500.00-540.00
18-8 turnings	420.00-440.00
430 bundles & solids	110.00-120.00
430 turnings	80.00-85.00

CLEVELAND

No. 1 heavy melting	51.00-52.00
No. 2 heavy melting	46.00-47.00
No. 1 bundles	51.00-52.00
No. 2 bundles	38.00-39.00
No. 1 busheling	51.00-52.00
Machine shop turnings	33.00-34.00
Mixed borings, turnings	35.00-36.00
Short shovel turnings	35.00-36.00
Cast iron borings	35.00-36.00
Cut foundry steel	54.00-55.00
Cut structurals plates 2 ft and under	59.00-60.00
Alloy free, short shovel turnings	39.00-40.00
Electric furnace bundles	52.00-53.00

Cast Iron Grades

No. 1 cupola	53.00-54.00
Charging box cast	42.00-43.00
Heavy breakable cast	42.00-43.00
Stove plate	49.00-50.00
Unstripped motor blocks	35.00-36.00
Brake shoes	42.00-43.00
Clean auto cast	52.00-53.00
Burnt cast	40.00-41.00
Drop broken machinery	55.00-56.00

Railroad Scrap

No. 1 R.R. heavy melt.	53.00-54.00
R.R. malleable	61.00-62.00
Rails, 2 ft and under	76.00-77.00
Rails, 18 in. and under	77.00-78.00
Rails, random lengths	71.00-72.00
Cast steel	64.00-65.00
Railroad specialties	67.00-68.00
Uncut tires	66.00-67.00
Angles, splice bars	66.00-67.00
Rails, rerolling	75.00-76.00

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	450.00-475.00
18-8 turnings	290.00-300.00
430 clips, bundles, solids	95.00-100.00
430 turnings	40.00-45.00

YOUNGSTOWN

No. 1 heavy melting	53.00-54.00
No. 2 heavy melting	49.00-50.00
No. 1 bundles	53.00-54.00
No. 2 bundles	41.00-42.00
No. 1 busheling	53.00-54.00
Machine shop turnings	34.00-35.00
Short shovel turnings	38.00-39.00
Cast iron borings	38.00-39.00
Low phos.	54.00-55.00
Electric furnace bundles	54.00-55.00

Railroad Scrap

No. 1 R.R. heavy melt.	55.00-56.00

CHICAGO

No. 1 hvy melt, indus.	49.00-50.00
No. 1 hvy melt, dealer	46.00-47.00
No. 2 heavy melting	42.00-43.00
No. 1 factory bundles	*52.00-53.00*
No. 1 dealer bundles	*47.00-48.00*
No. 2 bundles	39.00-40.00
No. 1 busheling, indus.	49.00-50.00
No. 1 busheling, dealer	46.00-47.00
Machine shop turnings	34.00-35.00
Mixed borings, turnings	36.00-37.00
Short shovel turnings	36.00-37.00
Cast iron borings	36.00-37.00
Cut structurals, 3 ft	*55.00-56.00*
Punchings & plate scrap	*56.00-57.00*

Cast Iron Grades

No. 1 cupola	45.00-46.00
Stove plate	41.00-42.00
Unstripped motor blocks	34.00-35.00
Clean auto cast	50.00-51.00
Drop broken machinery	50.00-51.00

Railroad Scrap

No. 1 R.R. heavy melt.	53.00-54.00
R.R. malleable	60.00-61.00
Rails, 2 ft and under	*66.00-67.00*
Rails, 18 in. and under	*67.00-68.00*
Angles, splice bars	*58.00-59.00*
Rails, rerolling	64.00-65.00

Stainless Steel Scrap

18-8 bundles & solids	510.00-525.00
18-8 turnings	355.00-375.00
430 bundles & solids	105.00-110.00
430 turnings	65.00-70.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*45.00-46.00*
No. 2 heavy melting	37.00-38.00
No. 1 bundles	*45.00-46.00*
No. 2 bundles	*34.00-35.00*
No. 1 busheling	*45.00-46.00*
Machine shop turnings	27.00-29.00
Mixed borings, turnings	28.00-30.00
Short shovel turnings	29.00-30.00
Punchings & plate scrap	56.00-57.00

Cast Iron Grades

No. 1 cupola	51.00
Charging box cast	44.00
Stove plate	45.00
Heavy breakable	44.00
Unstripped motor blocks	32.00
Clean auto cast	55.00
Malleable	56.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	46.50
No. 2 heavy melting	43.00
No. 1 bundles	46.50
No. 2 bundles	38.00
No. 1 busheling	46.50
Machine shop turnings	34.50
Short shovel turnings	36.50

Cast Iron Grades

No. 1 cupola	47.00
Charging box cast	40.00
Heavy breakable cast	40.00
Unstripped motor blocks	40.00
Brake shoes	50.00
Clean auto cast	50.50
Stove plate	41.00

Railroad Scrap

No. 1 R.R. heavy melt.	54.00
Rails, 18 in. and under	*68.00*
Rails, rerolling	*64.00†*
Rails, random lengths	*62.00*
Angles, splice bars	65.00

†Nominal.

PHILADELPHIA

No. 1 heavy melting	*56.00-58.00*
No. 2 heavy melting	*48.00-48.50*
No. 1 bundles	*56.00-58.00*
No. 2 bundles	*46.00-47.50*
No. 1 busheling	*56.00-58.00*
Electric furnace bundles	61.00
Mixed borings, turnings	44.00
Machine shop turnings	42.00-43.00
Short shovel turnings	46.00-47.00
Heavy turnings	*52.00-54.00†*
Structurals & plates	62.00-63.00
Couplers, springs, wheels	*69.00-70.00*
Rails, crops, 2 ft & under	*80.00*

Cast Iron Grades

No. 1 cupola	51.00-53.00
Heavy breakable cast	57.00-59.00
Malleable	66.00†
Drop broken machinery	58.00-59.00

†Nominal.

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	*51.00-52.00*
No. 2 heavy melting	*43.00-44.00*
No. 1 bundles	*51.00-52.00*
No. 2 bundles	*41.00-42.00*
Machine shop turnings	33.00-34.00
Mixed borings, turnings	34.00-35.00
Short shovel turnings	*36.00-37.00*
Low phos. (structural & plate	*57.00-58.00*

Cast Iron Grades

No. 1 cupola	45.00-46.00
Unstripped motor blocks	37.00-38.00
Heavy breakable	48.00-49.00

Stainless Steel

18-8 sheets, clips solids	475.00-485.00
18-8 borings, turnings	345.00-370.00
430 sheets, clips, solids	105.00-110.00
410 sheets, clips, solids	95.00-100.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*47.00-48.00*
No. 2 heavy melting	*36.00-37.00*
No. 1 bundles	*47.00-48.00*
No. 2 bundles	*35.00-36.00*
No. 1 busheling	*47.00-48.00*
Machine shop turnings	30.00-31.00
Mixed borings, turnings	31.00-32.00
Short shovel turnings	34.00-35.00
No. 1 cast	*41.00-42.00*
Mixed cupola cast	*40.00-41.00*
No. 1 machinery cast	44.00-45.00

BUFFALO

No. 1 heavy melting	53.00-54.00
No. 2 heavy melting	46.00-47.00
No. 1 bundles	53.00-54.00
No. 2 bundles	42.00-43.00
No. 1 busheling	53.00-54.00
Mixed borings, turnings	36.00-37.00
Machine shop turnings	33.00-34.00
Short shovel turnings	37.00-38.00
Cast iron borings	36.00-37.00
Low phos.	*55.00-56.00*

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	47.00-48.00
No. 1 machinery	53.00-54.00

Railroad Scrap

Rails, random lengths	*62.00-63.00*
Rails, 3 ft and under	*67.00-68.00*
Railroad specialties	57.00-58.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	48.50-49.50
No. 2 heavy melting	41.00-42.00
No. 1 bundles	48.50-49.50
No. 2 bundles	36.50-37.50
No. 1 busheling	48.50-49.50
Machine shop turnings	34.00-35.00
Mixed borings, turnings	34.00-35.00
Short shovel turnings	36.00-37.00
Cast iron borings	33.50-34.50
Low phos. 18 in.	55.00-56.00

Cast Iron Grades

No. 1 cupola	44.00-45.00
Heavy breakable cast	44.00-45.00
Charging box cast	44.00-45.00
Drop broken machinery	55.00-56.00

Railroad Scrap

No. 1 R.R. heavy melt.	52.00-53.00
Rails, 18 in. and under	73.00-74.00
Rails, random lengths	63.00-64.00

BIRMINGHAM

No. 1 heavy melting	*43.00-44.00*
No. 2 heavy melting	*39.00-40.00*
No. 1 bundles	*43.00-44.00*
No. 2 bundles	*31.00-32.00*
No. 1 busheling	*43.00-44.00*
Cast iron borings	*26.00-27.00*
Short shovel turnings	*36.00-37.00*
Machine shop turning	34.00-35.00
Bar crops and plate	55.00-56.00
Structural & plate, 2 ft	54.00-55.00
Structurals & plate, 3 ft	54.00-55.00
Electric furnace bundles	50.00-51.00
Electric furnace, 2 ft & under	48.00-49.00

(F.o.b. shipping point)

Cast Iron Grades

No. 1 cupola	*51.00-52.00*
Stove plate	51.00-52.00
Unstripped motor blocks	42.00-43.00
Charging box cast	40.00-41.00
No. 1 wheels	42.00-43.00

Railroad Scrap

No. 1 R.R. heavy melt.	*49.00-50.00*
Rails, 18-in. and under	66.00-67.00
Rails, rerolling	*64.00-65.00*
Rails, random lengths	*59.00-60.00*
Angles, splice bars	*58.00-59.00*

SEATTLE

No. 1 heavy melting	53.00
No. 2 heavy melting	51.00
No. 1 bundles	51.00
No. 2 bundles	31.00-34.00
Machine shop turnings	*33.00-35.00*
Mixed borings, turnings	*33.00-35.00*
Electric furnace No. 1	62.00-65.00

Cast Iron Grades

No. 1 cupola	54.00-56.00
Heavy breakable cast	48.00-50.00
Unstripped motor blocks	*43.00-45.00*
Stove plate (f.o.b. plant)	42.00-43.00

LOS ANGELES

No. 1 heavy melting	*55.00*
No. 2 heavy melting	*51.00*
No. 1 bundles	*54.00*
No. 2 bundles	*36.00*
Machine shop turnings	*34.00*

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	60.00

SAN FRANCISCO

No. 1 heavy melting	55.00
No. 2 heavy melting	50.00
No. 1 bundles	54.00
No. 2 bundles	38.00
Machine shop turnings	35.00
Mixed borings, turnings	35.00
Cast iron borings	35.00
Heavy turnings	35.00
Short shovel turnings	37.00
Cut structurals, 3 ft	63.00

Cast Iron Grades

No. 1 cupola	60.00
Charging box cast	47.00-49.00
Stove plate	48.00
Heavy breakable cast	42.00
Unstripped motor blocks	50.00
Clean auto cast	60.00
No. 1 wheels	50.00
Drop broken machinery	62.00

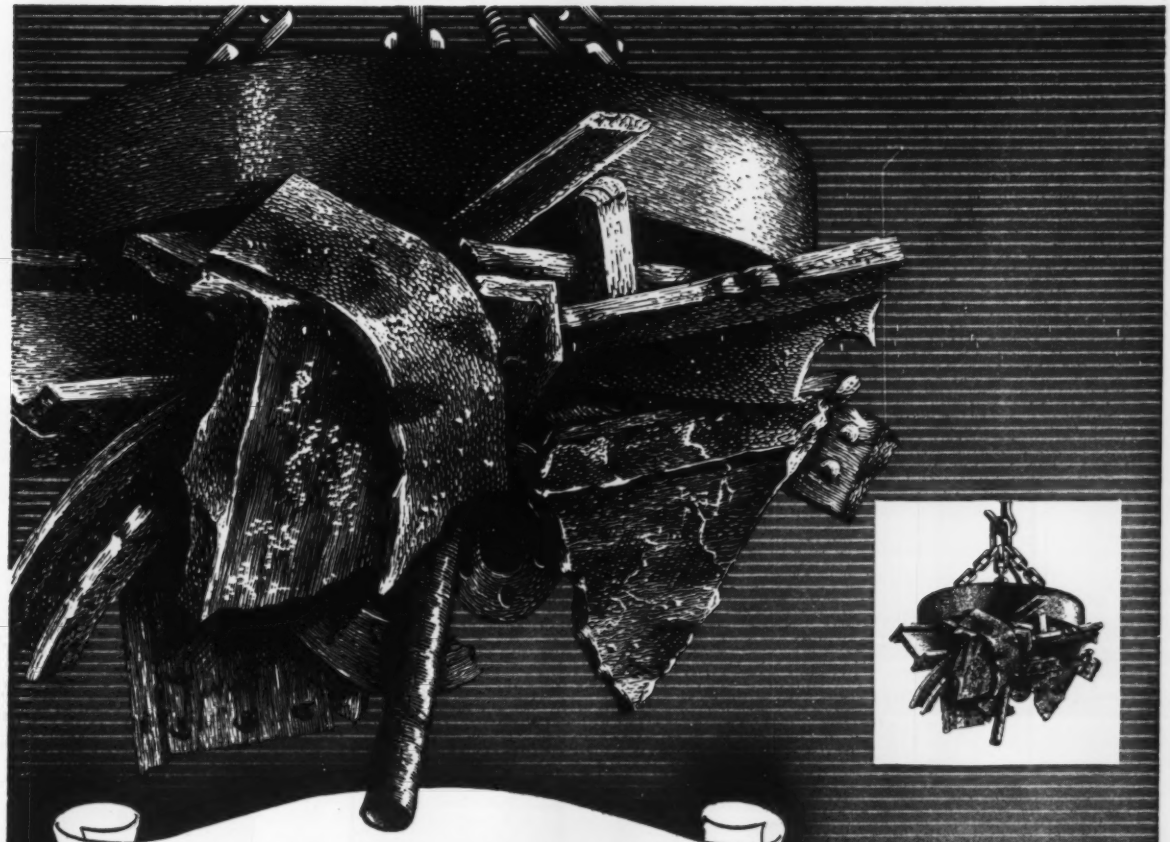
HAMILTON, ONT.

No. 1 heavy melting	50.00
No. 2 heavy melting	44.00
No. 1 bundles	50.00
No. 2 bundles	38.00
Mixed steel scrap	42.00
Busheling, new factory: Prepared	48.00
Unprepared	44.00
Short steel turnings	31.00

Cast Iron Grades†

No. 1 machinery cast	50.00

†F.o.b., Hamilton, Ont.



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EXPORTS-IMPORTS LIVINGSTON & SOUTHARD, INC. 99 Park Ave., New York, N. Y. *Cable Address:* FORENTRACO

Inventories Hit Bottom?

Sales of nonferrous metals are not spectacular, but there are growing signs that the low point has been passed. Orders marked "rush" are beginning to flow in

Nonferrous Metal Prices, Pages 158 & 159

"RUSH OUR ORDER. Shipment hasn't arrived. Please trace it."

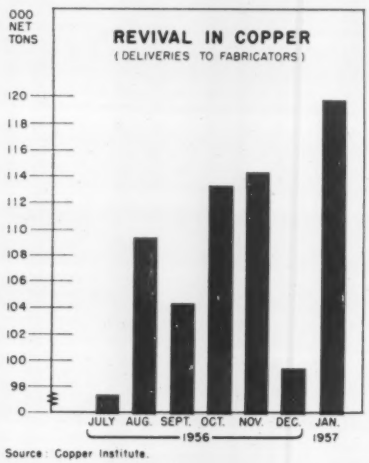
Such requests (by telephone and telegraph) are in the minority, but they may be the first solid indication that metalworking is finally reaching the bottom of its inventory of nonferrous metals.

Other barometers are helping to keep nonferrous producers confident.

Copper — World deliveries to fabricators jumped from 237,003 tons in December to a rousing 263,514 tons in January, reports the Copper Institute. Deliveries to fabricators outside the U.S. hit an alltime peak of 143,589 tons. Copper people are scratching their heads. Reports one: "We expected the statistics to be up, but the increase in foreign demand was much more than we anticipated." A possible explanation: Russia may have entered the market quietly for substantial tonnages. U.S. fabricators received 119,925 tons of copper (see chart) during January. This was an increase of 20,331 tons over December.

Primary copper continued its downward trend toward the 30 cent a pound level. The three leading primary producers are selling at 32 cents. The custom smelters' price is about 31 cents.

Outlook—Part of the copper industry has contracts with the government which state that the metal can be purchased for U.S. stockpile at about 31 cents a pound and lower. Each contract was developed on an individual basis, and it is estimated that the contracts may run from about 27 to 31 cents a pound. With these contracts providing a floor and demand showing day-by-day increases, look for the price to stabilize (world labor willing) at between 30 and 32 cents. Point to remember: Brass mills, which consume some 50 per cent of the available metallic copper, will not show significant increases until brass mill customers are convinced that the price of copper has stabilized.



Source: Copper Institute.

Lead, Zinc—Businees is routine one day, heavy the next for both metals. February shipments should run 10 to 15 per cent ahead of January's. As Detroit unlimbers its stepped-up production schedules, look for sales to improve.

"We are receiving some panic orders and expect more during the coming month," says one sales manager. "We are sure that some of our customers have reached the absolute bottom of inventory."

Magnesium—Demand for ingots and heavy forging stock is heavy. The aircraft, missile and electronics industries are providing a ready market. Sheet, extrusion and casting shipments are paralleling last year's sales pattern but should show some improvement during the coming months. First quarter ingot and forging stock sales could be about 10 per cent above those of the corresponding period a year ago.

Aluminum—Diecasters are sending in a few rush orders. Most are just beginning to get additional business from appliance and auto makers. Competition for mill products sales is still intense. Primary production, reports the Aluminum Association, was 147,030 tons in January. December: 148,391 tons.

Market Memos

- Ingot brass and bronze shipments totaled 25,681 tons in January, says the Defense Council of the Ingot & Bronze Industry. It was the best month since April, 1956, when shipments reached 25,808 tons.
- New York will have a 34-story building with a gold facade (anodized aluminum) at 575 Lexington Ave. Reynolds Metals Co. has the contract for the anodized panels and sprandrels.
- There are no spot deliveries on tin because of the dock strike. The future market has been showing signs of strengthening, then weakening. March delivery quotations are around 99.25 cents a pound.

NONFERROUS PRICE RECORD

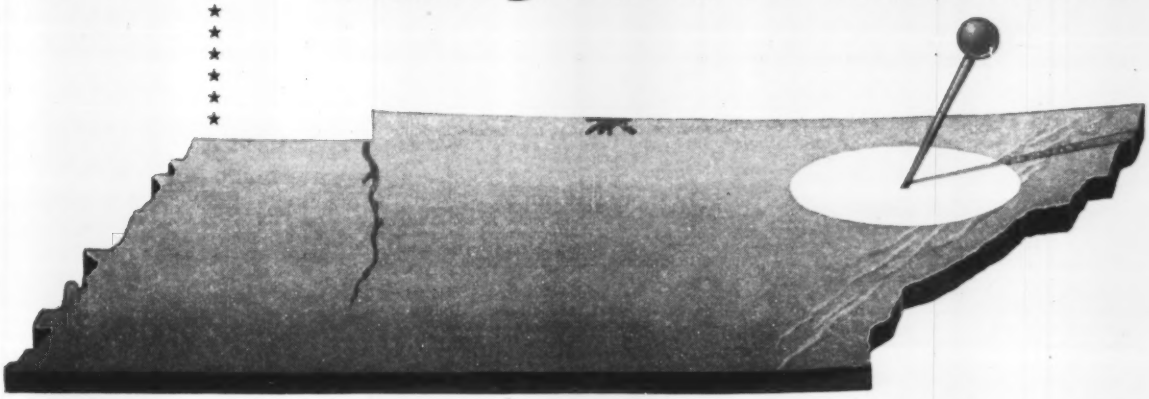
	Price Feb. 6	Last Change	Previous Price	Jan. Avg.	Dec. Avg.	Feb., 1956 Avg.
Aluminum ..	27.10	Aug. 10, 1956	25.90	27.100	27.100	24.400
Copper	31.00-32.00	Feb. 19, 1957	31.00-34.00	35.433	35.650	48.076
Lead	15.80	Jan. 13, 1956	16.30	15.800	15.800	15.800
Magnesium .	35.25	Aug. 13, 1956	33.75	35.250	35.250	32.500
Nickel	74.00	Dec. 6, 1956	64.50	74.000	70.880	64.500
Tin	100.00	Feb. 19, 1957	100.50	101.480	104.465	100.908
Zinc	13.50	Jan. 6, 1956	13.50	13.500	13.500	13.500

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deld.; MAGNESIUM, pig, 99.8%, Velasco, Tex.

We've discovered

PART OF AMERICA'S FUTURE

underground in Tennessee



As the American economy has expanded, the use of zinc by industry has greatly accelerated, until today's per capita consumption of zinc shows a giant 24% increase over the per capita consumption only seven years ago.

But what about the future? With zinc's importance to Industry's ever-increasing demands, what about the supply?

In recent months, American Zinc has discovered a part of America's industrial future... underground in Tennessee. In the East Tennessee area, mining properties which adjoin American Zinc's long-established Mascot, Tenn., mining operations, exploration and development have confirmed zinc ore reserves underground which are equivalent to *more than 75 years' production at the current rate* of mines now operating in this area.

Tomorrow's zinc for automobile grills and trim... the galvanized coatings for steel... zinc for die-castings and brass... zinc pigments for paints and rubber... now lies underground in American Zinc's Tennessee development.

American Zinc, lead & smelting company

Columbus, Ohio · Chicago · St. Louis · New York · Detroit · Pittsburgh

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99+%, ingots 27.10; pigs, 25.00, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 28.90; No. 43, 28.70; No. 195, 30.30; No. 214, 30.50; No. 356, 28.90. 30-lb ingots.

Antimony: R.M.M. brand, 99.5%, 33.00; Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.50-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 97-99%, $2.35 per lb for 550-lb keg; $2.37 per lb for 100-lb case; $2.42 per lb under 100 lb.

Columbium: Powder, $119.20 per lb, nom.

Copper: Electrolytic, 32.00 deld. Conn. valley; 32.00 deld. Midwest; custom smelters, 31.00-31.50 deld; lake, 32.00 deld.; fire refined, 31.75 deld.

Germanium: First reduction, $201.85-$220 per lb; intrinsic grade, $220-$242.67 per lb, depending on quantity.

Gold: U.S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $100-$110 nom. per troy oz.

Lead: Common, 15.80; chemical, 15.90; corroding, 15.90, St. Louis. New York basis, add 0.20.

Lithium: 98+%, cups or ingots, $11.50; rod, $13.50; shot or wire, $14.50, f.o.b. Minneapolis, 100 lb lots.

Magnesium: Pig, 35.25; ingot, 36.00, f.o.b. Velasco, Tex. 13 in. sticks, 59.00, f.o.b. Madison, Ill.

Magnesium Alloys: AZ91B (diecasting), 37.25 deld.; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $255-$257 per 76-lb flask.

Molybdenum: Extruded ingot, $9.60 per pound, f.o.b. Detroit.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot or ingots for addition to cast iron, 74.50; prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01.

Osmium: $80-$100 per troy oz, nom.

Palladium: $23-$24 per troy oz.

Platinum: $96-$101 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $118-$125 per troy oz.

Ruthenium: $45-$55 per troy oz.

Selenium: 99.5%, $12.00-$15.00 per lb.

Silver: Open market, 91.375 per troy oz.

Sodium: 16.50, c.l.; 17.00, l.c.l.

Tantalum: Sheet, rod, $68.70 per lb; powder, $56.63 per lb.

Tellurium: $1.65 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot, 100.00; prompt, 99.25.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max), $2.75; grade A-2 (0.5% Fe max), $2.50 per pound.

Tungsten: Powder, 98.8%, carbon reduced. 1000-lb lots, $4.20 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $5. Treated ingot, $6.70.

Zinc: Prime Western, 13.50; brass special, 13.75; intermediate, 14.00, East St. Louis, freight allowed over 0.50 per pound. New York basis, add 0.50. High grade, 14.85; special high grade, 15.25 deld. Die casting alloy ingot No. 3, 18.00; No. 2, 19.00; No. 5, 18.50 deld.

Zirconium: Ingots, commercial grade, $14.40 per lb; low-hafnium reactor grade, $23.07. Sponge, commercial grade, $10 per lb; reactor grade, $14-$22 per lb, depending on quantity. Powder electronics grades, $15 per lb; flash grade, $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 23.25-28.75; No. 12 foundry alloy (No. 2 grade), 23.00-23.25; 5% silicon alloy, 0.60 Cu max, 24.25-25.50; 13 alloy, 0.60 Cu max, 24.25-25.50; 195 alloy, 24.00-26.25; 108 alloy, 22.00-23.00. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 22.75; grade 2, 21.50; grade 3, 20.50; grade 4, 19.75.

Brass Ingot: Red brass, No. 115, 31.50; tin bronze, No. 225, 40.50; No. 245, 35.00; high-leaded tin bronze, No. 305, 35.50; No. 1 yellow, No. 405, 25.75; manganese bronze, No. 421, 28.50.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.50; AZ91C, 37.50; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nominal 1.9% Be alloy.) Strip, $1.85-$1.86, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.82, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 30,000-lb lots, 37.355; l.c.l., 37.98. Weatherproof, 30,000-lb lots, 37.78; l.c.l., 38.53. Magnet wire deld., 15,000 lb or more, 44.68; l.c.l., 45.43.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $21.50 per cwt; pipe, full coils, $21.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheets and strip, $11.00-$14.75; sheared mill plate, $9.25-$11.25; wire, $8.50-$11.00; forging billets, $6.85-$7.10; hot-rolled and forged bars, $7.10-$7.35.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 24.00; ribbon zinc in coils, 21.50; plates, 20.00.

ZIRCONIUM

Plate, $20.35; H.R. strip, $23.95; C.R. strip, $32.00; forged or H.R. bars, $18.40; wire, 0.015 in., 8.00c per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	126	106	128
Strip, C.R.	124	108	138
Plate, H.R.	120	105	121
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

Sheet and Circles: 1100 and 3003 mill finish (30,000 lb base; freight allowed)

Thickness Range, Inches	Flat Sheet	Coiled Sheet
0.249-0.138	40.90-45.40	.....
0.135-0.096	41.40-46.50	37.70-39.60
0.095-0.077	42.10-48.30	37.80-39.80
0.076-0.061	42.70-50.60	38.20-40.50
0.060-0.048	43.40-52.90	38.80-41.50
0.047-0.038	43.90-55.60	38.60-42.90
0.037-0.030	44.30-50.00	40.40-44.70
0.029-0.024	44.90-52.40	41.00
0.023-0.019	45.80-52.20	42.00
0.018-0.017	46.60-53.30	42.60
0.016-0.015	47.50-53.90	43.40
0.014	48.50-50.90	44.40
0.013-0.012	49.70-52.10	45.10
0.011	50.70-53.70	46.30
0.010-0.0095	52.10-54.40	47.60
0.009-0.0085	53.40	49.10
0.008-0.0075	55.00	50.03
0.007	56.50	51.80
0.006	58.10	53.20

ALUMINUM (continued)

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	40.2	44.5
5050-F	41.3	45.6
3004-F	42.3	47.5
5052-F	42.9	48.2
6061-T6	44.4	50.0
2024-T4*	48.1	54.4
7075-T6*	55.4	62.5

*24-48 in. widths or diam., 72-180 lengths.

Screw Machine Stock: 30,000 lb base.

Diam., (in.) or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	74.30	71.50	....	....
0.156-0.172	63.00	60.40	....	....
0.188	63.00	60.40	....	76.40
0.219-0.234	59.70	57.20	....	....
0.250-0.281	59.70	57.20	....	73.00
0.313	59.70	57.20	....	69.60
0.344	58.50	....	....	....
Cold-finished				
0.375-0.547	58.80	57.50	70.10	65.50
0.563-0.688	58.80	57.50	66.70	61.60
0.750-1.000	57.40	56.00	61.00	58.10
1.063	57.40	56.00	....	56.10
1.125-1.500	55.20	53.90	59.00	56.10
Rolled				
1.563	53.70	52.40	....	....
1.625-2.000	53.10	51.60	....	....
2.125-2.500	51.70	50.30	....	....
2.563-3.375	50.20	48.70	....	....

Forging Stock: Round, Class 1, 43.30-55.90 in specific lengths 36-144 in., diameters 0.375-8 in. Rectangles and squares, Class 1, 48.10-63.20 in random lengths, 0.375-4 in. thick, width 0.750-10 in.

Pipe: ASA schedule 40, alloy 6063-T6, standard lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
⅜	$18.45	2	$ 57.90
1	29.00	4	157.20
1¼	39.25	6	281.65
1½	46.95	8	423.80

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	45.90-47.50	61.50-65.80
12-14	46.20-47.70	62.20-66.80
15-17	46.40-48.30	63.50-68.50
18-20	47.00-48.80	65.50-71.10

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec. grade, .032 in., 171.30; .081 in., 108.70; .125 in., 98.10; .188 in., 95.70; .250-2.0 in., 93.30. Thread plate, .188 in., 71.70; .250-2.0 in., 70.60; Tooling plate, .250-3.0 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	69.60-72.40	84.60-87.40
12-14	70.70-73.00	85.70-88.00
24-26	75.60-76.30	90.60-91.30
36-38	89.20-90.30	104.20-105.30

NONFERROUS SCRAP

DEALER'S BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 1100 clippings, 13.00-13.50; old sheets, 8.00-8.50; borings and turnings, 6.00-

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	54.13b	51.36c	....	54.32	28.000	28.000	27.250
Yellow Brass	47.52	37.69d	48.06	50.43	21.875	21.625	20.125
Low Brass, 80%	50.20	50.14	50.74	53.01	24.250	24.000	23.500
Red Brass, 85%	51.14	51.08	51.08	53.95	25.000	24.750	24.250
Com. Bronze, 90%	52.63	52.57	53.17	55.19	25.875	25.625	25.125
Manganese Bronze	55.43	49.53	....	....	20.500	20.250	19.750
Muntz Metal	49.79	45.60	....	....	20.750	20.500	20.000
Naval Brass	51.69	46.00	....	55.10	20.500	20.250	19.750
Silicon Bronze	58.60	57.79	58.64	60.68e	27.375	27.125	26.375
Nickel Silver, 10%	64.06	....	....	....	28.250	28.000	14.125
Phos. Bronze, A-5%	73.17	73.67	....	....	28.875	28.625	27.625

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded

6.50; crankcase, 8.00-8.50; industrial castings, 8.00-8.50.

Copper and Brass: No. 1 heavy copper and wire, 23.00-23.50; No. 2 heavy copper and wire, 21.50-22.00; light copper, 19.00-19.50; No. 1 composition red brass, 21.00-21.50; No. 1 composition turnings, 20.00-20.50; yellow brass turnings, 12.00-12.25; new brass clippings, 19.00-19.50; light brass, 12.00-12.50; heavy yellow brass, 14.00-14.50; new brass rod ends, 16.50-17.00; auto radiators, unsweated, 15.00-15.50; cocks and faucets, 16.00-16.50; brass pipe, 16.75-17.25.

Lead: Heavy, 12.00-13.00; battery plates, 6.25-7.00; linotype and stereotype, 13.00-14.00; electrotype, 12.50-13.00; mixed babbitt, 13.00-13.50.

Monel: Clippings, 80.00-85.00; old sheets, 75.00-80.00; turnings, 65.00-75.00; rods, 80.00-90.00.

Nickel: Sheets and clips, 150.00-185.00; rolled anodes, 150.00-185.00; turnings, 135.00-160.00; rod ends, 150.00-185.00.

Zinc: Old zinc, 4.50-5.00; new die-cast scrap, 3.75-4.00; old die-cast scrap, 2.25-2.50.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 17.00; 3003 clippings, 17.00; 6151 clippings, 17.00; 5052 clippings, 16.50-17.00; 2014 clippings, 16.00-16.50; 2017 clippings, 16.00-16.50; 2024 clippings, 16.00-16.50; mixed clippings, 16.00; old sheets, 14.00; old cast, 14.00; clean old cable (free of steel), 16.00-17.00; borings and turnings, 14.00-15.00.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 56.00; light scrap, 51.00; turnings and borings, 36.00.

Copper and Brass: No. 1 heavy copper and wire, 26.50; No. 2 heavy copper and wire, 24.50; light copper, 22.25; refinery brass (60% copper) per dry copper content, 23.125.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 heavy copper and wire, 26.50; No. 2 heavy copper and wire, 24.50; light copper, 22.25; No. 1 composition borings, 21.50; No. 1 composition solids, 22.00; heavy yellow brass solids, 16.00; yellow brass turnings, 15.00; radiators, 17.00.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 50.29; oval, 49.42, 5000-10,000 lb; electrodeposited, 41.25; 2000-5000 lb lots; cast, 43.50, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, $1.015; 100-499 lb, 99.50; 500-4999 lb, 95.50; 5000-29,999 lb, 93.50; 30,000 lb, 91.50. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab; less than 200 lb, 119.50; 200-499 lb, 118.00; 500-999 lb, 117.50; 1000 lb or more, 117.00.

Zinc: Balls, 21.00; flat tops, 21.00; flats, 22.75; ovals, 22.00, ton lots.

CHEMICALS

Cadmium Oxide: $1.70 per lb, in 100-lb drums.

Chromic Acid: 100 lb, 33.20; 500 lb, 32.70; 2000 lb, 32.05; 5000 lb, 31.75; 10,000 lb, 31.25, f.o.b. Detroit.

Copper Cyanide: 100-1000 lb, 77.50.

Copper Sulphate: 100 lb, 26.65; 200 lb, 23.65; 300 lb, 22.65; 400 lb, 22.15; 500 lb, 20.65; 2000 lb, 18.40; 6000 lb, 18.15; 12,000 lb, 17.90, f.o.b. shipping point.

Nickel Chloride: 100 lb, 48.50; 200 lb, 46.50; 300 lb, 45.50; 400 lb, 43.50; 5000 lb, 41.50; 10,000 lb, 40.50.

Nickel Sulphate: 100 lb, 40.50; 200 lb, 38.50; 300 lb, 37.50; 400 lb, 35.50; 5000 lb, 33.50; 20,000 lb, 33.00; 36,000 lb, 32.50.

Sodium Cyanide: 100 lb, 27.50; 200 lb, 25.80; 400 lb, 22.80; 1000 lb, 21.80, f.o.b. Detroit.

Sodium Stannate: Less than 100 lb, 79.10; 100-600 lb, 69.70; 700-1900 lb, 67.00; 2000-9900 lb, 65.10; 10,000 lb or more, 63.80.

Stannous Chloride (anhydrous): Less than 25 lb, 169.00; 25 lb, 134.00; 100 lb, 119.00; 400 lb, 116.50; 5200-19,600 lb 104.30; 20,000 lb or more, 92.10.

Stannous Sulphate: Less than 50 lb, 131.60; 50 lb, 101.60; 100-1900 lb, 99.60; 2000 lb or more, 97.60.

Zinc Cyanide: Under 1000 lb, 55.55; 1000 lb and over, 53.55.

(*Concluded from page* 153)

in the local scrap market. Dealers anticipate another drop of $1 to $3 a ton. Specialty grades are moving lower. Low phos is being quoted at $50, off about $3 a ton; random rails at $63, down $2; cut rails, $68, $2 a ton lower.

While further downward price adjustments are in prospect for the steel mill grades, dealers don't anticipate any sharp decline now because mill supplies are generally tight, notably No. 2 heavy melting.

Cincinnati — The scrap market here has quieted down, and prices tend to be nominal in the absence of a buying test. Brokers are offering $48.50-$49.50 for No. 1 heavy melting steel.

Detroit—The scrap market here continues sluggish, but prices firmed up a bit over the past week. A purchase by Great Lakes Steel Corp. last week was responsible. No. 1 heavy melting is quoted up $1 to $45-$46; No. 1 bundles, $45-$46; No. 1 busheling, $45-$46; No. 2 bundles, $34-$35.

Seattle—Following a drop of $2 a ton in heavy melting steel prices early this month, the scrap market here appears stabilized for the moment. Holding heavy inventories, larger buyers are not purchasing in volume. Receipts are substantial, but unfavorable weather has curtailed shipments this month. Exporters are meeting prior commitments, and renewed buying on export account is expected shortly.

Los Angeles—Japanese demand, always a factor in bolstering the west coast scrap market, continues unabated. But buyers report scrap is beginning to pile up on the docks because of a shortage of shipping.

Birmingham — Scrap continues sluggish and weak. No. 1 cupola cast was cut $2 a ton last week. Most railroad items also were reduced. Open-hearth grades are down $1, except No. 2 bundles, unchanged.

There was a little excitement in the export market last week. An exporter who had to fill an entire vessel instead of only a portion of the cargo because of the shipping congestion at New Orleans

RADIAL DRILLS

CARLTON MODEL 5A 10'-26". Power Head and Column Clamping, Power Head Traverse, Power Elevation. Motor on Arm. New 1942.

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WANTED: FOREMAN FOR DRAWING DEPARTMENT. High and Low Carbon Wire Mill. Give full particulars. Reply Box 516, STEEL, Penton Bldg., Cleveland 13, Ohio.

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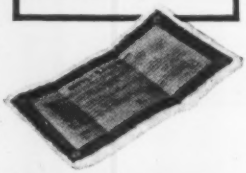

ACCO

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Japan would like to increase its imports of American scrap. A Japanese mission, including Yoshihiro Inayama, managing director, Yawata Iron & Steel Co., and Hiroshi Chori, chief, Japan's Heavy Industries Bureau in the Ministry of Trade & Industry, will ask Washington for permission to import between 2,300,000 and 2,480,000 tons of scrap this year.

Washington—Stocks of ferrous materials (scrap and pig iron) held by consumers on Dec. 31 totaled 8,715,000 gross tons, reports the Bureau of Mines. This was an increase of 5 per cent over stocks at the end of the preceding month and was 3 per cent above the total held on Dec. 31, 1955.

Scrap stocks at the end of the year were 6,613,000 tons, up 6 per cent from those on Nov. 30. Pig iron stocks amounted to 2,102,000, up 2 per cent. In the case of both scrap and pig iron, stocks were up 3 per cent, compared with those at the end of 1955.

Domestic consumption increased 1 per cent in December over the previous month. The total melt (12,670,000 gross tons) consisted of 49.5 per cent scrap and 50.5 per cent pig iron—this compares with 50.3 per cent and 49.7 per cent during November.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Union Pacific, fifteen 8500-hp gas turbine-electric locomotives, to the General Electric Co., Schenectady, N. Y.

RAILROAD CARS PLACED

Central Railroad of New Jersey, 50 seventy-ton gondola cars to the Johnstown, Pa., plant of the Bethlehem Steel Co., and 50 fifty-ton boxcars to the Pullman-Standard Car Mfg. Co., Chicago.

Chicago, Burlington & Quincy, 75 seventy-ton covered hopper cars, to the General American Transportation Corp., Chicago.

Colorado & Wyoming, 25 seventy-ton gondola cars, to the Pullman-Standard Car Mfg. Co., Chicago.

Kansas City Southern, 75 seventy-ton gondola cars, to the Johnstown, Pa., plant of the Bethlehem Steel Co., Bethlehem, Pa.

Philadelphia, Bethlehem & New England, 30 seventy-ton gondola cars, to the Johnstown, Pa., plant of the Bethlehem Steel Co., Bethlehem, Pa.

Chicago, Milwaukee, St. Paul & Pacific, 200 seventy-ton covered hopper cars and 50 seventy-ton flatcars, to the Pullman-Standard Car Mfg. Co., Chicago, and 100 fifty-ton insulated boxcars, to the Pacific Car & Foundry Co., Renton, Wash.

Northern Pacific, 25 seventy-ton covered hopper cars, to the General American Transportation Corp., Chicago.

Orinoco Mining Co., Venezuela, 525 one-hundred-ton ore cars, to the Magor Car

Baltimore & Ohio, 200 seventy-ton covered hoppers, to the Pullman-Standard Car Mfg. Co., Chicago.

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Coming

March 4

IN

STEEL

Where Are They Now?

Do engineering graduates become shoe clerks, insurance salesmen or even company presidents? Is the charge valid that part of the shortage of engineers stems from the drift by graduates to alien fields?

STEEL finds answers to those questions by turning detective and unearthing the current status of members in Case Institute of Technology's Class of 1941.

Getting your share of today's $400 billion market?

These dynamic and expanding times call for sales methods that measure up to the modern buying market. A tremendous amount of money is spent by industry for needed goods and services—*over $135 million each business day.*

There are many ways in which a company can assure itself of a fair share of our fast-moving industrial market: through sales expansion . . . marketing realignment . . . new products . . . and advertising. One of the most economical ways is with *a well-balanced advertising program!*

Industrial advertising goes to work at once, reaching and selling more of the people you want—now! It adds effective sales push in all the scattered corners of the vast buying market—as well as in the areas and offices your salesmen don't have time or opportunity to cover. And industrial advertising requires only a fraction of your total sales investment.

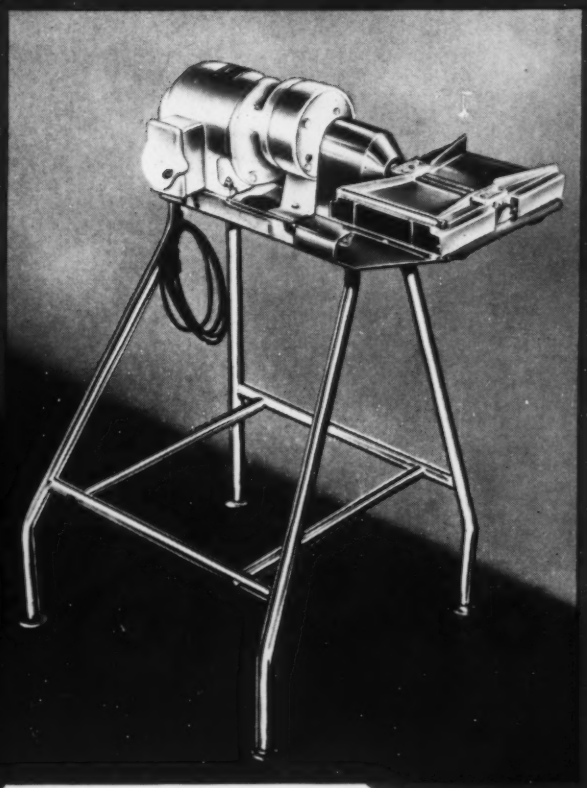
One business success after another has proved *it pays industry to advertise to industry.*

NATIONAL INDUSTRIAL ADVERTISERS ASSOCIATION, INC.

271 Madison Avenue, New York 16, N. Y.

An organization of over 4000 members engaged in the advertising and marketing of industrial products, with local chapters in ALBANY, BALTIMORE, BOSTON, BUFFALO, CHICAGO, CLEVELAND, COLUMBUS, DALLAS-FORT WORTH, DENVER, DETROIT, HAMILTON, ONT., HARTFORD, HOUSTON, INDIANAPOLIS, LOS ANGELES, MILWAUKEE, MINNEAPOLIS-ST. PAUL, MONTREAL, QUE., NEWARK, NEW YORK, PHILADELPHIA, PITTSBURGH, PORTLAND, ROCHESTER, ROCKFORD, ST. LOUIS, SAN FRANCISCO, TORONTO, ONT., YOUNGSTOWN.

THERE'S MORE THAN ONE WAY TO SKIN A GIZZARD!



Power Gizzard Skinner Means Better Production for packers! Driven by a Master ¼ H.P. Double Parallel Gearmotor, output speed 230 R.P.M.

ANOTHER DRIVE REQUIREMENT MEETS ITS MASTER

"But my drive problems are different," you say, and right you undoubtedly are. Far as we know, this Master-powered Gizzard Skinner is unique.

But here's the point. America's productive genius consists of the ability to analyze a problem, devise a system and apply power to it in such a way as to produce better results faster at less cost. And *that problem* we bet you've got!

Let us help! Tell us the problem. From the drives listed here—or a combination of the required ones in one compact efficient unit—we'll deliver the goods! That's just what we've done for many, many years, to an ever-enlarging cross-section of American industry jealous of the performance of their motor equipment.

Motor Ratings..1/8 to 400 H.P. All phases, voltages and frequencies.

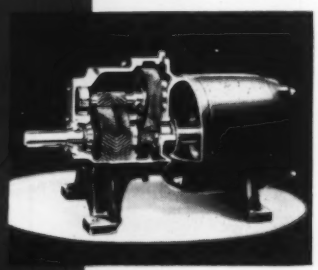
Motor Types.....Squirrel cage, slip ring, synchronous, repulsion-start induction, capacitor, direct current.

Construction.....Open, enclosed, splash-proof, fan-cooled, explosion-proof, special purpose.

Speeds.....Single-speed, multi-speed, and variable speed.

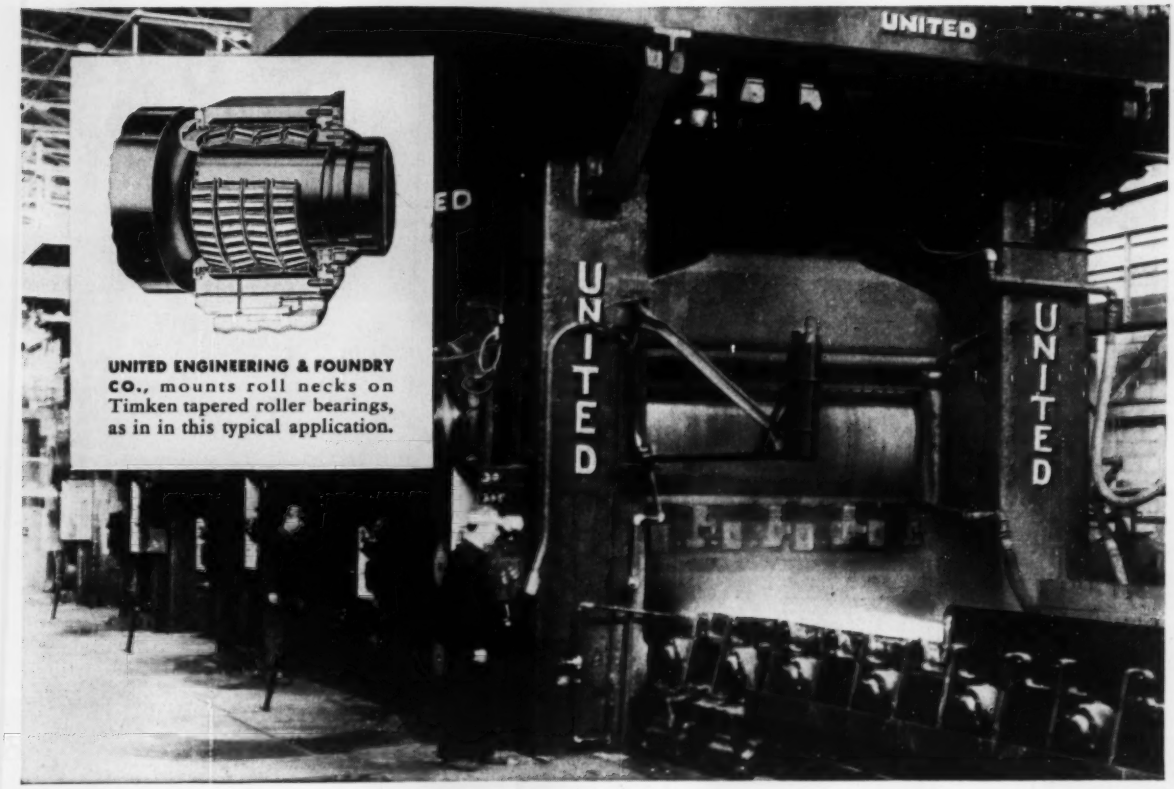
Installation.....Horizontal and vertical, with or without flanges and other features.

Power Drive Features.....Electric brakes (2 types)—5 types of gear reduction up to 432 to 1 ratio. Mechanical and electronic variable speed units—fluid drives—every type of mounting.



THE MASTER ELECTRIC COMPANY

Dayton 1, Ohio



UNITED ENGINEERING & FOUNDRY CO., mounts roll necks on Timken tapered roller bearings, as in in this typical application.

Another record! TIMKEN® bearings on this plate mill have rolled 9 million tons of steel

THIS 100″ 4-stand continuous plate mill — built by United Engineering — went into service at U. S. Steel's Homestead Works in 1936. Some of the Timken® tapered roller bearings on work rolls and back-up rolls have now rolled 9 million tons of steel—all 31 Timken bearings in the mill have rolled an average 5 million tons.

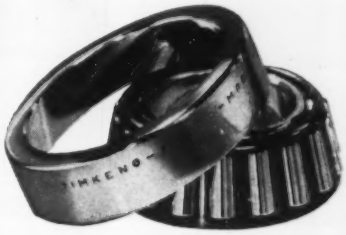
One big reason for this record is the fact that Timken bearings practically eliminate friction. They're geometrically designed and precision-made for true rolling motion. Timken bearings offer low frictional resistance. Higher rolling speeds are possible. Acceleration is easier. There's less skidding and scuffing between rolls. Less repair and maintenance.

By holding rolls rigid, Timken bearings help insure "on-gauge" operation, reduce scrap loss. And by holding shafts and housings concentric, Timken bearings make closures more effective, reduce lubricant leakage. Cut lubricant cost. Grease-lubricated Timken bearings require no tubes, pipes or reservoirs—cut lubrication system maintenance. No extra thrust devices are needed—the tapered construction of Timken bearings lets them take radial and thrust loads. Chuck mountings are more compact. Mill design is simplified.

Tonnage records indicate that the long life of Timken bearings keeps bearing cost per ton of steel rolled to a minimum. And prolonged roll life is assured because Timken bearings provide maximum roll neck strength, less wear. Mills using balanced proportion Timken roll neck bearings increase roll neck strength up to 60%—load ratings up to 40%. The balanced proportion design permits larger diameter roll necks without increasing bearing O.D.—maximum capacity in less space.

For lowest cost per ton of steel rolled, look for the trade-mark "Timken" on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ont. Cable: "TIMROSCO".

This symbol on a product means its bearings are the best.



TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS ROLL THE LOAD